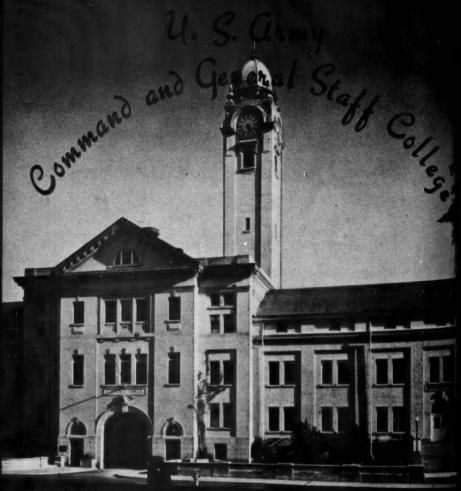
ILITARY REVIEW



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FEBRUARY 1958 VOLUME XXXVII

NUMBER II



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The MILITARY REVIEW disseminates modern military thought and current Army doctrine concerning command and staff procedures of the division and higher echelons and provides a forum for articles which stimulate military thinking. Authors, civilian and military alike, are encouraged to submit articles which will assist in the fulfillment of this mission.



POLICY.

Unless otherwise indicated, the views expressed in the original articles in this magazine are those of the individual authors and not necessarily precisely those of the Department of the Army or the U.S. Army Command and General Staff College.

Editor.

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TWIXT THE DEVIL AND THE DEEP BLUE SEA

Major Reginald Hargreaves, British Army, Retired

Ay me, what perils do environ
The man who meddles with cold iron.

-Hudibras, Samuel Butler

As SOCRATES pointed out in 410 B. C., "good order" is essential to an efficient fighting force, since "a disorderly mob is no more an army than a heap of building materials is a house."

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"Good order" is founded upon discipline; and the cornerstone in the edifice of discipline is the prompt, wholehearted, and unquestioning obedience to orders.

Orders originate in policy; they are the means by which intention is transmuted into action. It follows that the originator of policy automatically incurs not only responsibility for the morality of the design itself, but for its outcome when the execution of his orders has turned it into an accomplished fact.

In early times this dual responsibility was vested unreservedly in, and accepted by, a single individual—the tribal chieftain, the "Man on the Shield," established in authority by virtue of his superior wisdom, his power of decision, and his outstanding prowess in arms.

If "the man set in authority" succeeded in his dual capacity of statesman and war leader, the *réclame* and the first fruits of political success or military victory were his. If he failed, he lost his standing—

and very probably his head. Thus when ancient Britain came under the Pax Romana, it was the tribal leader Caractacus who was borne away in chains to Rome, his people of the Silurian clan expiating through him the opposition they had been led to offer to the Legions of Aulus Plautius.

When the tribal chieftain, through sanctification by the priesthood, acquired the mystical qualities of sovereignty, the "divine right of kings" personally to decide all questions of policy was accepted without thought of demur. And despite the gradual emergence of a Curia Regis, or council of advisors, the warrior-monarch ultimately stood or fell by the measures he himself both devised and implemented. William Bastard of Normandy became William the Conqueror, with a firm seat on the throne of England, simply and solely because the policy he pursued throughout the reorganization of his new possessions made for greater national unity and increased prosperity, while instituting better military means of safeguarding the general welfare of the community. His success carried with it its own justification.

The administrator charged with framing national policy must ensure that such policy results in the promulgation of legal military orders which are capable of being carried out confidently and unquestioningly

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Notwithstanding the steady increase in the influence of the Curia Regis and the birth of such deliberative assemblies as the English Parliament, the Estates General in France, and the Reichstag in Germany, the identification of the monarch with the policy generally pursued remained a salient feature of the interplay of the European peoples for many centuries. In the east regal absolutism was accepted as a matter of course.

Representative Government

Toward the end of the 17th century, however, a growing demand arose for a more broadly based system of policymaking in which the views of the people themselves-expressed through their chosen representatives-should be given weight. England's Charles I, with his quite genuine, but outmoded, belief in the divine right of the Sovereign to determine all matters of policy, initiated measures so much in conflict with the prevailing climate of opinion that his attempt to implement them brought him to the scaffold. The day of absolutism had ended; the new concept envisaged a constitutional monarchy, with the Sovereign no more than the mouthpiece of the policy framed by his advisors-men chosen by a parliamentary body elected by popular vote.

With this development the responsibility for framing policy and subsequently carrying it into execution no longer rested on one man. It became distributed between that body of ministers selected by the legislature which formed the government, and the government's servants which in-

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cluded the military commanders charged, in time of war, with the task of translating measures agreed in council into successful action on the field of battle.

With the monarch no more than a rubber stamp for the endorsement of the policy decisions of the administration, the entire responsibility for the measures decided upon came to rest fairly and squarely on the shoulders of the civil ministers. The functions originally reserved to the Sovereign having passed to his advisors, it generally was accepted that "In the decisive moments of history the ideas of the statesman must take precedence over those held by the military." In effect, under any constitution other than a military dictatorship, service chiefs can have no direct concern with policymaking, and shoulder no responsibility for the measures decided upon by the administration. In their technical capacity, of course, they can be called upon to advise whether a particular course of action can be pursued successfully with the means available. When so consulted, their council should not be disregarded lightly, for policy can never be stronger than the armed force available to carry it out.

In actual practice, however, the distinction between policy and strategy diminishes the nearer the apex of governmental direction is approached. At the summit they are seen to be virtually indivisible, since, as Clausewitz points out, "war is an extension of policy by other means." General Eisenhower voiced the concurrence of the services in this concept when he affirmed that "political considerations can never be wholly separated from military ones; war is a mere continuation of political policy in the sphere of action."

Designation of Responsibility

This consideration, however, does not affect the allocation of responsibility. The military remain answerable for carrying

¹ Napoleon I.

out the policy determined upon; the civil administration for the far graver decision to pursue a particular course of action. In effect, there is a dualism of responsibility which is not horizontal but perpendicular.

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The military commander entrusted with the implementation of a certain line of policy is perfectly well aware of the fate awaiting him should he fail in his mission. Compulsory retirement in a general atmosphere of public odium is the least he can anticipate; while it is well within the bounds of possibility that he will face a court of enquiry, or even trial by courtmartial. This will apply even should he have advised against the practicability of the line of policy he has been ordered to carry out.

But what of the minister who must accept the ultimate responsibility for a policy decision that has ended in disaster?

Impeachment would appear to have fallen into desuetude; and public memory being astonishingly short-lived, except for a certain temporary inconvenience very little happens to the policymakers whose designs have gone awry. They may disappear from office for a time, but not for long. In most instances, however, they brazen it out stonily.

This wildly disparate treatment of the policymaker and the policy-executant could be illustrated by a score of instances, from times remote down to the war of 1939-45. The two that follow have been chosen in the belief that their general outline, if not their politico-military particulars, will be reasonably familiar.

Admiral Vernon

In 1739 British resentment at the country's exclusion from trade in Spanish South American waters was brought to fever heat by the complaint lodged by a certain merchant captain, Robert Jenkins. Summoned to the bar of the House of Commons, this somewhat dubious char-

acter had produced a desiccated object, carefully wrapped in cotton wool, which he had sworn to be the ear sliced from his head by a Spanish guarda costa. The public demand that this outrage should be avenged ended in orders being given to Admiral Edward Vernon to proceed to the Caribbean, to harass Spanish shipping, and, if possible, make good his boast to take Portobelo with no more than half a dozen warships. Vernon was not only a serving officer but a member of Parliament who had criticized the Walpole Administration with considerable freedom. It is possible, therefore, that contemporary gossip was not exaggerating when it averred that the Ministry "was not without hopes that Vernon would disgrace himself and his party [of opposition] by failing in the exploit he had undertaken."2

If Robert Walpole, the Duke of Bedford—the contemporary First Lord of the Admiralty—and their colleagues had entertained such expectations, they were speedily disappointed. Vernon took Portobelo with precisely the number of vessels he had stipulated, and at remarkably small cost. The news of this feat, and of the subsequent capture of Chagre, aroused the wildest enthusiasm in Britain where the innkeepers—ever sensitive to the wind of popular favor—hurriedly had their signs repainted to show a hook-nosed Duke of Bedford or a pugnacious, red-faced Admiral Vernon.

Returning to Jamaica to refit, Vernon learned that the administration, anxious to exploit his success, proposed to send out a body of troops for an amphibious operation against Havana, with Cartagena, on the mainland, as a possible alternative. On receipt of this intelligence Vernon wrote at once, in the strongest possible terms, deprecating the entire idea of land operations in any form. The unsuitability of the terrain, the prevalence of tropical

² The Angry Admiral; the Later Career of Edward Vernon, Admiral of the White. Cyril Hughes Hartmann.

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fever and disease, the moral certainty of the soldiery "getting sickness by drinking too much rum," combined with the dearth of all warlike supplies, was emphasized with the robust vigor and commonsense of a man whose views on the project were founded on years of experience of local conditions.

The Minister's reply was a curt intimation that a British force, 8,000 strong, under Lord Cathcart would arrive shortly at Jamaica, and would be joined by a body of provincial troops. With the assembly of both contingents Vernon found himself committed to an enterprise against which he had warned the administration with all the urgency at his command.

That the subsequent attempt on Cartagena was not helped by the fact that, on Cathcart's untimely death, the military command passed to an officer with whom Vernon was entirely out of sympathy, is not to be denied. But if two individuals as close as Damon and Pythias had held the respective naval and military commands, the result would have been the sameabject and costly failure which "strewed the sea with English corpses," and entirely substantiated those warnings of disaster which the responsible Minister had persisted in disregarding. Yet it was Vernon who, in due course, was relieved of his command and relegated to the Retired List: and it was the Duke of Bedford who remained in office.

General Burgoyne

Operations in North America had reached something of a stalemate in 1776. In November of that year General John Burgoyne returned to England with a document entitled "Thoughts for Conducting the War From the Side of Canada." The plan envisaged an advance southward from Ticonderoga, at the same time as another, body of troops ascended the Hudson from New York. Both forces were to link up at Albany. Obviously, the ob-

ject of the operation was to cut off the New England States from those of the south—in effect, to divide and conquer. Strategically, it was a perfectly sound plan providing it was coordinated closely and remained sufficiently flexible, and the administration had no hesitation in adopting it and making it their own. The design having become a matter of ministerial high policy, responsibility for its implementation was entrusted to Lord George Germain, Secretary of State for Colonies and War.

In his early days, as the commander of the British cavalry at the Battle of Minden, Germain had exhibited such timidity that the verdict of a court-martial on his conduct had declared him "unfit to serve his Majesty in any military capacity whatsoever." Nonetheless, by the tortuous means only possible in 18th century politics, he had succeeded in worming his way into the Ministry of which Lord North was Premier.

With Burgoyne back in Canada, Germain's only contribution to the furtherance of the current policy was a spasmodic series of instructions which succeeded only in fatally hampering the plans of the man who had to carry the operation into effect. The "latitude" for which General Burgoyne had so wisely stipulated was flatly denied him. He was pinned to a specific line of advance which, as subsequently transpired, was the one that most dangerously reduced the venture's chances of success. In addition, through almost incredible negligence, Germain omitted to inform General Howe, in New York, of the share he was expected to bear in the enterprise. In consequence, Howe marehed away to capture-and be captured by-strategically unimportant Philadelphia, while Burgoyne, unsupported from New York, had no option but to surrender to Horatio Gates and the army

³ As Lord George Sackville. He changed his name to Germain on inheriting a substantial sum of money.

which had cut him off from all means of support.

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As a result, although it was plain that the fundamental responsibility for failure was Germain's, it was Burgoyne who suffered the King's displeasure, Burgoyne who was penalized by 10 years without military employment, while Germain continued to enjoy the sweets of office until the fall of the North Government in 1782.

In short, Vernon was sacked because Bedford should have been sent to the Tower and Burgoyne was shelved because Germain should have been impeached.

No such fate as had been meted out to unsuccessful tribal chiefs or absolutist medieval monarchs awaited the civil ministers who had taken on their shoulders the mantle of ultimate responsibility. They had learned—in the expressive modern phrase—to "pass the buck"; and the necessary scapegoat always could be found in one or other of the fighting services.

A tradition had crystallized which decreed that whenever anything went wrong, the blame invariably should be transferred from the first to the second echelon of responsibility, that the kitten always should be slapped for the puppy's offense.

Nürnberg Trials

With the years such tradition has come to be accepted as standard practice, a state of affairs that was never more sharply illuminated than during the course of what have come to be known as the Nürnberg Trials.

The trial of alleged "war criminals" came about as the result of a policy decision by a civilian body—the newly created United Nations Organization. Almost unquestioned, offenses were listed by representatives of the victor nations which had certainly not been stated as such at the time of the outbreak of hostilities in 1939. The indictment drawn up by UNO was, therefore, retrospective; the trial proceedings retroactive.

The aim of the Nürnberg proceedings was to bring home to the rulers of the Third Reich their alleged guilt on charges formulated under provisions embodied in the especially framed Charter of the Nürnberg Tribunal. This was a piece of improvised legislation that went far beyond the terms of the Geneva Protocol of 1925. defining offenses against the accepted "customs and usages of war," to which Germany had acceded in 1929. In addition. the defendants could be arraigned for the "planning, preparation, initiation, or waging of a war of aggression," or a war "in violation of international treaties"; and for "crimes against humanity"-the last named lending itself to interpretation as conveniently elastic as the classic "conduct to the prejudice of good order and military discipline" which can be manipulated to cover almost anything.

Since there was no one to challenge the victors as to the morality of improvising post facto legislation to agree with the prevailing climate of opinion—which undoubtedly was inclined to be vengeful—proceedings went forward as planned. Those responsible for inflicting five terrible years of war upon the world were to be brought to trial even if an entire cycle of new laws had to be devised to accomplish this.

If any doubts arose as to the equity of framing post facto legislation to meet a particular case, they were swept aside by the recollection that demands to "hang the Kaiser"—which had been such a feature of Lloyd George's 1919 "khaki election"—had been frustrated by the German Emperor's flight to the sanctuary of a neutral Holland that had steadily refused all demands to yield him up to the victores.

Precedent Established

In the general resolve to see justice done to the warmongers of Nazi Germany, two highly important considerations were overlooked entirely: First, that

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a precedent was in process of being created which would render it possible for any victor nation of the future, with every parade of legality, to treat the civil leaders of their vanquished foes as mere irresponsible banditti, and their military chiefs as so many francs-tireurs. Second, that the sole and actual wielder of supreme authority in the Third Reich—an individual far more powerful than William II and, therefore, far more heavily charged with responsibility—already had eluded human justice, having committed felo-de-se some time previously.

However, the Tribunal was prepared to consider a number of smaller fry—Hess, the Führer's erstwhile deputy, Ribbentrop of the Foreign Office, and some minor departmental chiefs. What was entirely unprecedented, however, was the appearance in the dock of the surviving heads of the services. They were men whose only responsibility had been to carry out the orders given them by the administration—in effect, the Führer.

Throughout the entire proceeding it was never proved that these particular defendants were doing anything other than obey explicit commands, for the primary issue of which not they but the civil administration had been responsible. They were commands, moreover, that could have been ignored or mitigated only at the cost of trial by court-martial, and almost certain death.

Nevertheless, a number of these erst-while service chiefs were penalized for fulfilling what amounts to the fighting man's first obligation—to carry out the orders given him by his superiors. Small wonder that when the verdicts of the Tribunal were announced, Field Marshal Montgomery could comment grimly, "The Nürnberg trials have made the waging of unsuccessful war a crime for which the admirals and generals of the defeated side will be tried and hanged."

It is not, of course, suggested for one

moment that the Nürnberg Trials were conducted with anything but scrupulous fairness, within their particular terms of reference.

But since it is not only necessary that justice should be done, but that it should also be seen to be done, it would have been far better if the German defendants had been tried under long-established laws by an obviously impartial tribunal such as the Hague Court. With neutral judges drawn from Switzerland, Spain, and Sweden, no dubiousness on the score of partiality could possibly have arisen.

Terms of Reference

Where Nürnberg was concerned it was the novelty of the Tribunal's terms of reference that has occasioned the perturbation which prevails, not only in military circles, but also among many of the more responsible jurists. Apart from the severity of the verdicts, the ad hoc procedure at Nürnberg has shrouded in ambiguity the question of the degree of responsibility for actions incurred by the combatant, nor can it be said that subsequent legislation has done much to clarify this issue.

It may be accepted as extremely unlikely that any westerner in uniform would give the order for, or be party to, bestialities on the lines of the Oradour-Sur-Glane or Ardientine Caves atrocities, or the slaughter in their open boats of the survivors of the torpedoed Landovery Castle.4 By any standards, outrages such as these must take rank as war crimesalthough it is to be borne in mind that a subordinate failing to carry out the commands of a man capable of reenacting such barbarities would have the choice between immediate death for refusal to obey orders, or eventual execution as a war criminal.

There are, however, issues of a far less flagrant nature that rank as punishable

⁴ The surviving members of the crew of the offending U-boat were dealt with in exemplary fashion by a German court in 1921.

offenses by current reckening. It is with regard to these that the contemporary attitude of the law demands the most serious examination.

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According to the provisions of the Geneva Convention—as interpreted by Chapter XIV of the Manual of Military Law (MML), in circulation up to April 1944—members of the armed forces who violated "the customs and usages of war" in obedience to a superior's orders were not to be regarded as war criminals. In consequence, they were immune from punishment by their enemies, although those selfsame adversaries were free to penalize those (civil) officials, or military commanders, responsible for the primary issue of the inadmissible orders—should the opportunity arise to arrest and try them.

This view of the subordinate's absolute responsibility to yield unquestioning obedience was supported fully by the French doctrine of the droit administratif. This unequivocally states that an order must be obeyed by a subordinate, whatever his view as to its validity. (Darlan's dilemma in North Africa in 1942 can be far better understood if it is realized that, as a subordinate of Pétain, he was not free, according to the immutable hierarchical code represented by the droit administratif, to take any decision without reference to the government in Vichy.)

It was under the terms embodied in Chapter XIV of the Manual of Military Law that the conflict of 1939-45 was fought,

Manual of Military Law Revised

In 1944, however, an international jurist, Professor Hersch Lauterpacht, was called in to revise Chapter XIV of the MML, with the result that the governing paragraph now decrees that:

War guilt is governed by the major principle that members of the Armed Forces are bound to obey lawful orders only, and that they cannot escape liability if, in obedience to a command, they commit acts which both violate unchallenged rules of warfare and outrage the general sentiments of humanity.

It is true that this passage is preceded by a paragraph which runs:

A court confronted with a plea of superior orders adduced in justification of a war crime is bound to take into consideration the fact that obedience to military orders not obviously unlawful is the duty of every member of the Armed Forces, and that the latter cannot, in conditions of war discipline, be expected to weigh scrupulously the legal merits of the order received.

The fact remains that by the new ruling the combatant is under statutory obligation to gauge the legality of the orders given him by a superior in rank. Thereafter, if arraigned as a war criminal, it is not so much for the prosecution to prove his guilt, as for him—if he can—to demonstrate his innocence. Obviously, this constitutes a complete reversal of the fundamental principle of law—in which both the United States and Britain assent—which holds that the accused must be accounted as innocent until his guilt has been established to the entire satisfaction of the court.

Following the amendment to Chapter XIV of the MML came Article 8 of the Statute of Nürnberg and Law 10 of the Control Commission of Germany, both of which left the onus of establishing his innocence to the accused rather than requiring the prosecution to demonstrate his guilt. Starting, therefore, with a presumption of guilt, all too often the accused would find the task of proving his innocence well-nigh impossible. Up to this time only French courts have taken the line that the accused is guilty until he has proved his innocence.

The publication in the summer of 1955 of the German Soldatengesetz implies that

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a distinctly modified code will govern the activities of the future West German Army. Article 9 states that no combatant must carry out any order that would lead him to commit a war crime. If, however, he does not know—and circumstances do not indicate to him—that by obedience to his orders he would commit such a crime, then no question of his guilt can arise.

This is considerably nearer to an equitable approach to this difficult issue than the 1944 amendment to the governing clause in Chapter XIV of the MML: and something along the lines of the Soldatengesetz regulation should form the basis of a further amendment to the paragraph in question.

Need for Clarity

Now is surely the best moment in which to clear away some of the muddled thinking with a breath of cold reality. The cardinal rule of warfare is to win. Within this framework certain recognized restraints have been agreed upon in the interest of all belligerents. The difficulty of precisely determining their nature, purpose, and limitations is witnessed by the fact that, so far, the Political Committee of the United Nations has failed entirely to produce a definition of what constitutes "aggression."

In plain terms, what it amounts to is that, except in its acceptance as governing relatively minor matters, international law is no more than an abstraction—like peace or a problem in the higher mathematics. We have a vague idea as to what it aims, but it has no concrete existence, and is quite impotent in itself, since no transcendental means exist to enforce it. The legal luminaries are fain to concede that, "It must be emphasized that the rules of international law apply only to warfare between civilized nations, where both parties understand them and are prepared to carry them out."

The "Rules of War," being extremely

vague and inexact in themselves, and the improvised amendments made to them encouraged the Chinese Communists to claim that all United Nations personnel were taking part in a "war of aggression" and, if captured, would be liable for death. On this specious but—as things stand—legally unassailable premise, over 30,000 unfortunate captives were done away with in the name of the Geneva Convention and international law. They included 11,622 of the United Nations command.

Where the other Communist power is concerned, it is unlikely in the extreme that the restraints sought by international law would win the respectful observance of men who could coolly countenance the mass murder of Katyn.

Importance of Discipline

In military matters there are some things with which you cannot haggle since they form the foundation upon which the entire edifice of a disciplined armed force is erected. The cornerstone upon which all else depends is discipline itself, "the engrained habit of obedience to orders." An order, therefore, must be regarded as sacrosanct; for the sacred is the one thing that cannot be questioned.

Theirs not to reason why, Theirs not to make reply.

The moment that everybody is free to challenge or quibble at commands, the entire structure of discipline is undermined.

A man must believe in the integrity of his superiors, right through the chain of authority. Without that confidence in the individual who gives him his commands, he lacks the morale which differentiates the good serviceman from the bad. Once he is encouraged to examine every order before he carries it out, confidence is shattered and morale, in the words of "Vinegar Joe," "is a bust."

In the last analysis, responsibility for the issue of orders must be traced right back to the source—in the case of the democratic countries to the heads of the civil administration. Under the present dispensation they would be well-advised to take counsel's opinion before they order anybody to do anything, for it is an inviolable principle of the law that the accessory before the fact shares the responsibility of the man to whose deeds he is a party. If, on the other hand, an intermediary alters or expands an order to the real detriment of the "customs and usages of war" hitherto observed by both belligerents, then, obviously, his superiors are exonerated and culpability will rest with him. But it is quite inadmissible to make any subordinate who obeys the illegal orders of a superior an accomplice in that superior's crime.

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for right the The man who takes up arms in his country's service is entitled not only to a worthy cause and a sound plan of action, but to all the protection his superiors can exert on his behalf. Regardless of rank, he is the instrument of a policy in which he has no voice in framing. He receives his orders and carries them out to the best of his ability. It is not for him to question their validity; more and more must he take them for granted. As that eminent jurist, H. T. Paget, has pointed out, "The more war becomes 'total,' the greater be-

comes the responsibility of the politicians for its conduct, and the less becomes the responsibility of the admirals and generals"—and even less that of their subordinates. It was Stalin and the Politburo who were responsible for the Katyn massacre, not the wretched men of the firing party who carried out their orders.

Conclusion

In the heat of battle the fighting man cannot stop to consult the Manual of Military Law or the Protocol of the Legal-Political Committee of the United Nations. That is a consideration which cannot be pointed out too forcibly to those at home. To verify the legality of their orders is the responsibility of the policymakers whose designs have rendered the issue of those orders a logical necessity. That is a responsibility they can no longer be allowed to ignore. If the future is to witness any more "Nürnberg Trials," it must be with the understanding that those really responsible for policy, and its consequences, are the ones who stand trial. It is only by acceptance of this principle that orders will cease to be the subject of bewildered controversy and become the media of swift, confident, and unquestioning obedience.

Our leaders must be men who are convinced that war in itself is never an end, that it is never justified except as a means to a better peace. Hence their vision must extend beyond the concept of victory in battle, to that of a better world thereafter. Such men will seek to proportion and apply military power to the bare essentials of the military objective. At the same time, they will have the breadth of vision to combine military force into an integrated national strategy along with political, economic, and ideological factors which, in felicitous proportion, will generate maximum strength from the resources of the free world.

General Maxwell D. Taylor

The Field Army in Exploitation

Major Robert H. Allan, Jr., Corps of Engineers Faculty, U. S. Army Command and General Staff College

A LTHOUGH field armies exploited in the Second World War and the Eighth United States Army exploited in Korea, the question whether large ground formations will again be so used in any future conflict is one that must be answered before we can devise the tactics and support procedures which will permit such operations.

Historically, weapons development outstrips tactics and, to a lesser extent, strategy. The gap between the type of weapons currently possessed and methods of using them tactically has never been wider than at the present time. This gap is being narrowed—but very slowly. The lag in the development of modern tactics for the employment of the arsenal that science is providing for future land combat is due to many factors—some of which are indeterminate, or at least subject to question, and will remain so until war comes.

The United States Army and, specifically, the Command and General Staff College is developing the concepts and doctrine upon which the combat and support units of our field forces can base the tactics and support procedures with which to fight every type of ground action. These actions may vary from a nonatomic police action to a general war which could involve the world in a conflict where the use of mass destruction weapons is unrestricted.

There is no way to predict with certainty how the next war will be fought.

It has been this inability which has caused hesitation and, in some cases, confusion in the development of tactics for the various possible battlefields of the future. If rathe

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In the absence of fact it seems only reasonable to assume various sets of conditions and then to proceed with a discussion to determine if a unit the size of a field army can survive under the assumed conditions and, if so, how it might best be employed in various type operations. This discussion is concerned with an analysis of one form of the offensive—the exploitation—when conducted by a field army or larger unit.

The recurrence of a general war without atomic weapons being employed on the battlefield is a possibility for which we are adequately prepared. If atomics are not used in general war, the tactics, organizations, and administrative and logistical support procedures already developed to fight such a war are excellent. This discussion, however, is not concerned with that type war, nor will any attempt be made to analyze conditions pertaining to local war requirements.

The framework for this situation is assumed to be a full-scale atomic world conflict between the forces of communism and the free world. In addition, it will be assumed that atomic weapons are virtually unlimited and delivery means not restricted to the present systems. The guided missile with all its ramifications will be developed fully and in use.

Under the conditions of an all-out atomic world conflict between the forces of communism and the free world, ground operations probably will bear little resemblance to those which have been conducted in the past

If we assume these conditions, it seems rather safe to agree that from every point of view this is the situation which can place our military forces and, therefore, our Nation's and our allies' safety in the greatest jeopardy. This is the war which has not been fully thought out; the war which cannot be based on experience. Such a war must not find us lacking in the ability to utilize the tools that science and technology have provided. It is this all-out thermonuclear world war which provides the background for this discussion of the field army in an exploitation role.

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Strategic Utilization of Victory

General Karl von Clausewitz, in discussing the strategic means of utilizing victory, sets the stage for a comparative discussion of the field army in the exploitation on the atomic battlefield. He stated:

Usually both sides enter the battle with their physical powers considerably weakened, for the movements immediately preceding are usually of a very trying character. The exertion which the fighting out of great combat costs, completes the exhaustion. In addition to this, the victorious party is very little less disorganized and out of its original formation than the varquished, and therefore feels the need to reform, to collect stragglers and issue

Major Robert H. Allan, Jr., is a graduate of the University of Illinois, College of Mechanical Engineering. During World War II he served with the 88th Infantry in Italy. He was an original member of the US element of the Trieste garrison when that Free Territory was established by the United Nations in 1946. Other assignments include duty as assistant to the District Engineer, Kansas City District, Corps of Engineers; Command Engineer and in G4 Division, Headquarters, Allied Land Forces Southeastern Europe; and Commander, 39th Engineer Combat Battalion, Fort Riley, Kansas. He was assigned to the faculty of the U.S. Army Command and General Staff College upon graduation from the 1955-56 Regular Course.

fresh ammunition to those who are without.

This picture which he portrays of two exhausted combatants hanging onto each other with the victor largely unable to turn to good account the victory gained often has been true down through history. Invariably, this has been due to the fact that the victor has been required to create his own opportunity for exploitation. When the opportunity came—at the battlefield level—the victor did not possess the strength to exploit, and unless pursued or exploited, no victory can have a great effect.

It might be well to review what is meant by exploitation. Exploitation is the taking of full advantage of success in battle and the following up of initial gains. It is characterized by rapid advances against lessening resistance, deep objectives, bypassing strong points whose reduction is not essential to the mission, and engagements with enemy forces moving to halt the exploitation. It is a phase of offensive action that destroys the enemy's ability to reconstitute an organized defense or to engage in an orderly retrograde movement in the face of threatened disaster. Exploitation follows a successful penetration, envelopment, or link-up with airborne forces dropped in the enemy rear.

Pursuit is a phase of exploitation. It seeks to destroy the retreating hostile force. During the pursuit phase of the exploitation the enemy has lost his ability to influence the situation and reacts in consonance with the pursuer's action. The pursuing force usually consists of a direct pressure force and an encircling force which can be airborne, helicopterborne, or an armored and motorized force. Maximum latitude is given to the commanders of these forces and decentralization of control of fire support and of logistical means may be required.

Exploiting forces may be given the mission to seize objectives deep in the enemy

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rear to cut lines of communication, to surround and destroy enemy forces, to deny escape routes to encircled forces, and/or to destroy enemy general reserves (sometimes called strategic army forces).

Von Clausewitz did not visualize airpower or missilepower nor did he imagine thermonuclear firepower. But actually, this is of little importance because he, above all military writers, was dealing in principles. Even competent, professional, modern day military men have difficulty in realizing that we are on the threshold of being able to deliver an unlimited amount of firepower anyplace in the enemy world (except very close to the ground front) with air weapons including guided missiles. Any potential enemy must be credited with the same capability. The key words here are "unlimited" and "anyplace." This is what is really new in modern warfare-the fact that science is rapidly bringing to the strategic battlegrounds of the world a virtually unlimited amount of firepower that can be maneuvered by merely traversing a launching device in azimuth and moving it in elevation.

For centuries, military forces have toiled against the terrain and the forces of the enemy and nature to bring the power of their arms to bear against their enemies. Victory usually went to the side which first assembled and applied the greatest force at the decisive point. This will again be true and tactical ground forces will again toil against the enemy, the terrain, and the forces of nature in accomplishing their mission of seizing enemy land areas and controlling the people. But in unrestricted thermonuclear war the mission of larger tactical and strategic army forces and the conditions under which these forces will be used in accomplishing that mission may be vastly different. Instead of slugging the enemy until he is ready for the coup de grace and then perhaps being unable to administer it, the strategic ground forces may be the only means available to capitalize on the victory already launched by the sister services.

The Thermonuclear Exchange

The type of all-out atomic world war which provides the operational environment for this scenario probably will result in one of three sets of conditions being established between the participants. The thermonuclear exchange will result in ascendancy or dominance by one side; a lesser degree of employment of atomic weapons; or temporary stalemate.

The first condition is assumed to accrue in favor of the west in this article. The Western World will never start a war of any kind. Initiative and possibly surprise, therefore, favor the enemy. We cannot take the initiative but we may be able to avoid complete surprise. With reasonable warning, the bulk of our strategic air forces can be in the air-perhaps on the way to their initial targets. The fleets can be at sea and many of our land-based missile platforms, which must be at least semimobile, can be in motion or so recently relocated as to avoid the initial blow of the aggressor. Our strategic army forces can possibly avoid fatal damage. This is vitally important to victory. The exchange will be accompanied by almost immediate ground action in those areas where opposing forces are in close proximity. The army forces in contact will suffer severe damage mainly through loss of logistic and communication facilities. If they can maintain their integrity and shield vital land areas from a "walk-in" by Communist forces, they will have done their duty in the initial phase.

Objectives

Mass mutual destruction will then take place. During this exchange of missiles, bombs, and chemical and biological agents the west will pay a tremendous price. But, simultaneously, to establish the assumption of ascendance or dominance for the west, three things will have to be accomplished. First, the enemy's capability for high political direction of the war effort, to include the economic base from which government derives its power, must be largely destroyed. Second, destroy the aggressor's long-range will to fight—the will of the nation's people-not the will of his military forces. Decisive defeat of the Communist military forces will, in all probability, still be necessary before we, can impose our will on the Communist nations. Third, aggressor's strategic atomic and thermonuclear delivery capability will be destroyed. This will include his missile sites and strategic air forces. Air superiority will be won in the process. When these things have been done the ultimate outcome of the war will have been determined-provided the enemy is not given opportunity for rejuvenation-provided the victory is exploited and his military forces defeated.

Firepower alone cannot win wars. Unfortunately, in terms of land warfare, air and sea forces basically possess only a firepower capability. Both fire and maneuver must be combined to seize or at least gain control of the land areas from which man obtains his sustenance. When this is done the people and their government can be controlled. However, we need not, in fact, must not think in terms of seizing all land areas as we have in the past. The objectives for the strategic exploitation of the advantage which has been won by the devastating attacks of the naval and air forces must be decisive both from the political and the military viewpoint. Once in possession of certain key areas, we will be able to impose our will upon the Communist world. Then we must dictate the peace—a peace that truly contributes to the long-range political objectives of the free world. Once the peace is dictated in enforceable terms, it matters little whether these key areas are retained or exchanged.

In other words, thoroughly prepared, sustained land offensives and long-term occupation forces appear to be less and less a necessity.

The destruction of the enemy's governmental, military, and economic strength with thermonuclear weapons and the exploitation of this advantage by land forces employing tactical atomic weapons then seems to be the indicated pattern in applying the first principle of war-the objective. This appears to be the pattern. It may not be. But if it is, then there has at least been established a strategic premise from which tactics can be developed. Tactics developed for any purpose other than that of contributing directly to the aims of western strategy will prove unsound. Tactics to be proper must, therefore, have a strategic background similar to the one just assumed.

The Field Army

With this general strategic setting, it is necessary next to examine the field army in some detail. It would appear that the field army may have a role more limited in scope than in the past and yet a role no less vital. First, the armies now in Asia and Europe as well as the Strategic Army Forces in the United States and elsewhere must maintain their integrity and combat capabilities during the nuclear exchange previously mentioned. This requires that these formations possess a defensive capability against land, air, and missile assault. The Communist forces immediately in front of our forces along the Iron and Bamboo Curtains probably will initiate a ground attack simultaneously with the nuclear exchange. The force of this attack will initially not be greatly reduced by the reprisal assault from the strategic forces of the west. This enemy ground attack will come in overwhelming force and our ground forces undoubtedly will try to roll with the punch and trade space for the integrity of our own forces while

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shielding vital land areas. This requires that the field army possess a capability for conducting skillful retrograde movements —the most difficult tactical maneuver.

Strategically speaking, however, this Communist ground attack force, even though powerful, will constitute nothing more than a thick crust which will eventually crumble as a result of the tremendous damage inflicted during the nuclear exchange. Locally, ground warfare will be just as bitter as it has always been. But the tentacles of the Communist ground attack will begin dying the day after they are launched. Under these established conditions our land armies and those of our allies will not be required to line up shoulder to shoulder in army groups, wagging a communications zone tail, and engage the massed manpower of enemy land forces. If required to do this, they will, in all probability, be defeated. Rather these forces must defend themselves and their communications, maintaining combat power and integrity until the sister services create the strategic opportunity for exploitation. If the armies can accomplish these things during the initial phases, they will have a unique and vital role to play in the final phase of any general atomic war.

The strategic mobility of the new divisions of which the field army is soon to be composed will permit its movements to centers of enemy power. The field army, possibly still composed of corps, can be used to exploit the chaos created by nuclear attack, to seize vital facilities and communications centers, to establish order and military government, to encourage such elements of the population as will cooperate—in short, to secure the victory—to provide the punch of energy that has been missing throughout history when the time came to exploit.

This is a reversal of history. Traditionally, the Army has taken the brunt of the fighting at the outbreak of hostilities while

the Nation and her allies cranked out the air forces and the navies to carry the fight to the enemy.

General Tactics

It is pointed out that an attack capability, in the conventional sense of the term, is conspicuously absent from the list of tactical capabilities requirements. Exploitation is, however, a form of the offense. Under conditions of all-out atomic warfare, ground fighting probably will never again take on the characteristics of a coordinated land offensive of the World War II type. This statement must be meditated upon from the field army commander's point of view and higher. This premise merely means that so long as the enemy possesses a tactical atomic capability, the corps of the army will not be able to fight shoulder to shoulder in the offensive and survive.

It must be kept in mind that after the nuclear exchange has strategically broken the back of the Communist world, the enemy ground forces still in contact will have a tactical atomic capability and, perhaps, a local air capability for a considerable period of time—perhaps for a year or two or even longer. But it is during this period that the strategic exploitation must be launched in order to clinch the military victory.

This thought should not be construed to mean that divisions or even corps size units are finished with the job of attacking on the ground. They are not. They never will be. We must attempt to assign to the field army its proper role in the offensive of the future—the exploitation.

Special Tactics

If, then, the strategic framework is correct, if the weapons employment policy is valid, and if general tactical requirements are right, we should be ready to discuss the specific application of army level tactics to the employment of the

modern means of warfare which science is providing.

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A glance at a world map will reveal that the vital land areas do not lie immediately behind the lines of contact—that is to say, the Iron and Bamboo Curtains; rather, they lie deep in the hinterland. They are the seats of government and industry. They are the watergates and the land corridors without which the enemy cannot operate. They may be portions of the enemy force—his strategic army forces. These are the strategic objectives for which large land forces must strike.

Land forces must exploit and seize these areas before the Communists can recover from the shock of the nuclear exchange, before government and political direction can be reestablished, before airpower and atomic power can be reconstituted, before his strategic army forces can move against us. These are the objectives which must be recognized and established for our ground forces if we are to avoid the stalemate of parity which can lead only to a prolonged land battle, the outcome of which is in serious doubt. It is, of course, important to remember that intermediate objectives also may have to be selected and secured in the process of attaining decisive strategic objectives.

One single outstanding characteristic of any decisive strategic objective is that it must be attainable within the time and space limitations imposed. The current reorganization of US ground forces will eventually help to provide the strategic mobility necessary to overcome both the time and space limitations imposed by the selection of these deep objectives. When the Army eventually is completely reorganized and reequipped it will have a mobility both tactical and strategic that has never been known in the military history of the world. Airpower-transport airpower, both Air Force and Armycoupled with seapower will make this high degree of strategic mobility possible.

The infantry and airborne divisions are today, with minor exceptions, air transportable. Technological progress promises strategic air mobility for the armored division in the not too distant future. In other words, for the purpose of developing long-range tactical doctrine, we can plan on strategic mobility for the major fighting units of the field army—the three basic types of division.

Tactical mobility—battlefield mobility—once our forces arrive at the centers of enemy power, is already a reality. It is built into these new divisions or will be provided by supporting forces.

All of these new divisions have an organic tactical atomic weapons delivery capability. This means that every division commander now has available the means to deliver atomic weapons on the battlefield which have a destructive power equal to or greater than the weapons delivered by the B-29 against Nagasaki and Hiroshima during World War II. These fires are now considered conventional and have been thoroughly integrated with the other fires of the division. These organic divisional fires will be supplemented by corps and army means to include rockets and missiles of greatly increased range and power. Target acquisition means and tactical fire control methods are being developed for the rapid integration and use of these ground fires as well as air and naval fires.

Planning the Exploitation

At this point it is tempting to stop and theorize on strategy. This could lead to visualizations of when, where, and how the next war will start. To avoid this and in order to deal directly with the planning of an exploitation, assumptions and an imaginary situation will be used.*

Assume that it is D plus 6 months. The theater is the Far East. The nuclear ex-

^{*}The general situation used here is truly an imaginary one and is not based upon strategic terrain studies, war plans. or feasibility tests of any kind.

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change is complete. The strategic conditions assumed above for the west have been established. The allied armies in Europe have suffered heavily and have lost territory. But, by and large, control has been reestablished and very moderate pressure actually is beginning to be exerted on the Communist forces. War plans call for this moderate pressure to continue in Europe and elsewhere while the Strategic Army Forces of the United States and Canada launch an exploitation through the East China Sea and the Yellow Sea to seize Manchuria and thus divide Russia and Red China. The ultimate strategic objective of this one exploiting force is to seize a vital land area which will immediately divide the two major Communist powers, destroy the Chinese Communist Forces in Korea, and, finally, contribute to the control of Red China (see map).

The exploiting force is based on the Hawaiian and Mariana Islands. Advanced intermediate ballistic range missile (IRBM) fires are based on Japan and Okinawa together with intermediate logistical support. Flying LST's will use the sheltered water areas of the upper reaches of the Yellow Sea to fly replacements and critical tonnages to smaller pantobased (land and water based) planes which will move supplies forward from the HIDO (heavy intransit depot operation) airfields to the FIDO (forward intransit depot operation) airfields. This brief sketch of "theater administrative zone" type support and intermediate range strategic fires is only a suggestion. Detailed and intensive feasibility studies would be required in these fields in order to determine if the strategic concept visualized can be supported.

Assume that the exploitation is to be undertaken by the First Allied Army consisting of three corps of four divisions each. The I Canadian Corps consists of three infantry divisions and one armored

division somewhat similar to our own new divisions. The II and III US Corps each consist of three Pentomic Infantry Divisions and one ROCAD Armored Division. Thus the field army consists of a total of 12 divisions-nine infantry and three armored divisions with the necessary corps and army troops (a force of about 400,000 men). Assume also that the VII Airborne Corps (US) consisting of two Pentomic Airborne Divisions and the necessary transport aircraft and supporting troops has been moved to Hawaii. This airborne corps is under the control of the theater commander but the First Allied Army Commander has been told to plan for the use of such a force in a decisive role.

The bulk of the fighting troops of First Allied Army are in Japan and Okinawa having been moved by transport aircraft and fast atomic-powered transport ships the Continental United States (CONUS) and Canada. For safety, many combat support and service support units are dispersed in the Philippines and the Marianas. The VII Airborne Corps (US) is to be moved to Japan secretly, but at the same time deception stories are to be released concerning a proposed allied airborne invasion of the China coast opposite Taiwan. Strategic targeting prior to the outbreak of hostilities included targets for the ground exploitation now being prepared. Guided missiles and Strategic Air Command aircraft have atomized Harbin, Mukden, Peiping, and other strategic targets in the theater. Manchuria has been isolated. Strategic targets lying within or adjacent to the Yellow Sea approach to Manchuria are in ruins. The Russian missile sites from Vladivostok to the north, including those on Sakhalin Island, have been wrecked. Moscow itself is in ruins but it is evident that high political direction is being reestablished somewhere.

At the time of initiation of the nuclear exchange reliable intelligence reports indicated two Communist rifle armies in Korea and one in Manchuria. All have been attacked with multimegaton thermonuclear weapons but post-strike reconnaissance and damage assessment have failed to produce much conclusive evidence of the degree of damage inflicted on these formations except in Korea. The two rifle armies and their support installation in the peninsula have been damaged severely by the strategic attacks. Reinforcements from both Red China and Russia have been

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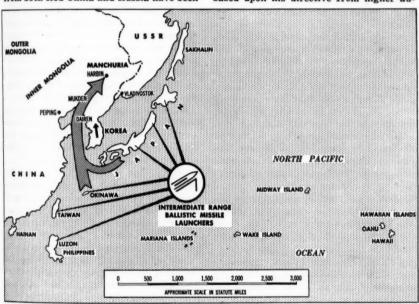
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shock operation as difficult as the one being imagined in this case.

Long ago the army commander would have visualized the operation. He would have arrived at a general idea of how he planned to fight the battle and he would have given more or less detailed planning guidance to his staff at that time.

The commander's planning guidance to his staff undoubtedly would have been based upon his directive from higher au-



attempting to breach the isolation which has been established about Manchuria and the peninsula, but IRBM units in Japan and Okinawa with a range in excess of 1,500 miles so far have prevented any buildup in Manchuria.

Of course, a vast amount of the planning for an operation of this type would have taken place months before while the Strategic Army Forces were still in the CONUS and Canada. And here, in advanced, detailed planning, lies the basic ingredient for success in a high-speed

thority and certain assumptions. These assumptions would either stand or fall as the planning proceeded. Very likely, one of the first assumptions which he would be required to make is one concerning the location (at the time of breakout) of the line of contact in the combination airhead-beachhead which he planned to seize. This line would be one which included enough space for the buildup and maneuver of a force of sufficient strength to launch and sustain the momentum of the exploitation. In addition, he would have been given a

broad timeframe in which D-day might occur.

Having assumed a line of contact the commander might include all or part of the following in his guidance:

1. Phasing of the operation.—In this case, assume that during Phase I the army commander plans to cut off the Dairen Peninsula with the VII Airborne Corps. During Phase I he also plans to airland a certain portion of the First Allied Army. This depends on available airlift versus available amphibious lift, however, the army commander indicated that he plans to airland two infantry divisions. He visualizes Phase II as the amphibious link-up between the seaborne and airborne forces and a buildup of minimum logistical support. Phase III is to be the breakout, Phase IV, the exploitation on a series of impulses to the limit of the range of IRBM fires from the initial locations of the launchers, Phase V, the airborne seizure of Harbin, and Phase VI, ground link-up with this force. In announcing his phasing the commander undoubtedly would emphasize all possible speed. Unless this entire concept can be implemented rapidly and boldly before the enemy can react, there is no hope of achieving the strategic objectives established for the force.

2. Use of tactical atomic weapons in the operation.-Included in the planning guidance will be an atomic weapons employment policy to ensure rapid rupture of any semblance of enemy defenses. The commander probably would state that if the enemy is able to build up a crust of resistance around the airhead, then he intends quickly to blast a hole in the enemy defenses employing a large number of smaller tactical atomic weapons. Perhaps this number would be on the order of 50 to 70 with yields from less than one kiloton to about 50 kilotons depending upon the strength and disposition of the opposing enemy formations. The strategic penetration has been made previously. This rupture to which we refer would be a rupture of hasty fortifications and enemy formations rushed against the airhead.

In addition, if there were any local shortages of these weapons, the commanding general would, in all probability, specify approximately how many tactical atomic weapons were to be retained in reserve to be used in defeating the enemy local reserves if and when any counterattacks came. Some also would be kept for dealing with on-call targets and targets of opportunity. This would ensure speed in the exploitation following the tactical penetration; that is, to assist in rapid reduction of enemy resistance encountered as the attack progresses. Finally, these weapons will be used to reduce the enemy's reinforcement capability. Atomic weapons employment guidance also should include a policy on friendly troop safety and the degree of damage to be inflicted on the scheduled targets.

3. Employment of the corps.-The army commander knows that he must stage his army through the airhead-beachhead in such a finely balanced degree of concentration that he achieves the necessary mass of fire and troop units for the breakout and yet minimizes his own vulnerability to atomic attack. He will guide the thinking of his staff on this matter at the time he issues his planning guidance. For example, he might ask the staff to study the feasibility of the early arrival of all three armored divisions in the airhead-beachhead with a view, perhaps, to attaching two of these divisions to the exploiting corps and retaining one initially as the army reserve. This reserve armored division might have to remain offshore until sufficient maneuver area ashore became available.

The preparation of alternate plans for the use of the four corps would be directed. This is necessary if an unexpected opportunity is to be seized. For instance, the teriors
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assi sior Exp side army commander may find a sadly deteriorated enemy condition when his airborne corps strikes. In such a case he may decide to use an alternate plan to piecemeal the exploitation as soon as forces become available rather than waiting for a buildup. The reverse situation could be true. At any rate, the army commander includes in his planning guidance all the uses of his corps which he wants investigated by the staff. In addition, he probably will state that the main attack of the exploiting force will be carried by one corps weighted with atomic weapons, missile units, army transport aviation, armor, and motorized infantry.

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4. Timing of the operation .- This is extremely difficult and may have to be decided later. This army has to advance over 800 miles. Critics may argue against the selection of such deep objectives. They may be right. But this is the war that has not been fully thought out-this is the war that cannot be based on experience. What is too deep? How fast can the new field army move? Montgomery went more than 1,200 miles when he left Alamein for Tunis. The desert over which he traveled is a hospitable paradise compared to the atomized waste over which the armies of the future may exploit in all-out war. Guderian went from Sedan on the Meuse to Dunkerque in a week using only a small fraction of Hitler's 130-division army. Actually, he isolated the British Islands and defeated France with 10 armored divisions, one parachute division, and one airtransported division plus airpower-a force smaller and less powerful than the one proposed here. He was able to do this because the strategic conditions were ripe for exploitation.

Bear in mind the strategic conditions assumed at the beginning of this discussion and the definition of the exploitation. Exploitation is launched only after considering all indications of deterioration of the enemy defenses. SAC has done its job. The successful accomplishment of the SAC mission will facilitate the advance of the new field army of from 50 to 150 miles a day in exploitation. IRBM fire support will be developed into something heretofore unknown on the battlefield. If the missile sites in Japan and Okinawa are destroyed or neutralized, the Seventh Fleet can reach Harbin with missiles from as far back as 500 miles east of Japan. IRBM units on northern Taiwan can also initially fire in support of this operation. Regardless of the arguments raised today about timing, when finally the task is to be planned the army commander will. where possible, indicate his time schedule to the staff in the course of giving planning guidance. In visualizing the tentative timing of the operation, it is necessary for the commander to anticipate where he may have to meet counterattacks of major proportions.

5. Logistical considerations.—Here is a problem area that can stagger the imagination. As mentioned previously, progress is being made in the study of a logistical system which can support the new field armies. It will be worked out. The logistical support system at the start of World War II was inadequate. We will have one far better if and when world war III starts, and it will be made to work. The army commander will include logistical considerations in his planning guidance. These may be far less complicated in 10 years than they are today. Fuel, ammunition, and food are the large tonnage items at present. Science may shrink this problem to midget size before we fight again. A good estimate of what would be needed immediately in the peninsula in this campaign would be a five-day supply of all items for the force present. With airlines of resupply well established, and 10 or 15 additional days of supply close at hand in Japan and Okinawa or afloat, this could be less. The weight and cube of this amount of supply has not yet been accurately computed but it may become surprisingly low. A central electronic power source which is completely mobile and from which an entire division of tanks and vehicles can receive power is not inconceivable. For short operations—two or three months—men may sustain health and energy on a handful of capsules. The men responsible for the defense of our country must be mentally and philosophically prepared to use what is going to come sooner or later.

6. Deception plans.—The planning guidance should include instruction for the planning and execution of deceptive measure to cover the operation.

Depending on the commander's personality and the experience of the staff assisting him, the probable planning guidance suggested here might either be somewhat reduced or expanded in great detail.

The commander and his staff would now proceed with the estimate. The immediate result of this commander-staff team estimate would be a decision on the part of the commander. This decision may have to be fragmentary or tentative. While the army is in the Continental United States and Canada, ail elements of information may not be available upon which to base a complete plan and, therefore, an outline plan would be produced by army and approved by army group headquarters if one had been organized. Otherwise, the originator of the planning directive probably would be the one to give tentative approval to the outline plan of the army commander.

As D-day drew closer and intelligence became more complete, this outline plan would be filled out and, ideally, would be in such form that all that remained to be done would be to publish the final approved plan as the army operation order.

Close Air Support

So far vital tactical air support has not been discussed. It might be appropriate to place tactical air support and close air support in the proper perspective for future war. The least economical weapon with which to engage ground targets with fire in support of land action is the piloted airplane. Theater air forces in World War II and Korea had six tasks to perform. These were counterair, interdiction, air defense, close air support, reconnaissance, and air transport. To avoid argument, assume that these six broad tasks will again cover the theater air force responsibilities.

The counterair mission must be successfully performed before sustained operations of any kind can be undertaken. Counterair operations should be relatively complete at the end of the nuclear exchange.

Interdiction is vital. Whether the job is done with planes or missiles is a mute point from the ground commander's point of view. The battlefield—the strategic battlefield—must be isolated.

Air defense is a must, and it is a joint responsibility for the ground and air commanders. The piloted aircraft is losing ground fast in the race with the surface-to-air missile. Whether or not this fact will increase the ground commander's responsibility for air defense remains to be seen. How air defense is accomplished, or by whom, is of secondary importance. The thoroughness with which it is done is all important in view of the destructive power of a single plane or missile which may penetrate our air defenses.

Only when weapons organic to the surface forces cannot deliver the necessary firepower to destroy or neutralize a target which interferes with or threatens those forces should aircraft be necessary to assist surface forces. The aircraft, as a potent military weapon, was born during World War II. As a result, the public and some military people have a mistaken idea concerning its power or even its necessity as a ground support weapon when the other tasks of theater air forces have been prop-

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erly performed. The ground commander must have under his direct control the battlefield surveillance equipment, the target acquisition equipment, and the fire capability necessary to perform his mission. This is axiomatic. When accepted as axiomatic it will reflect in ground force organization. When this occurs the airplane will assume a relatively minor role as a ground support weapon.

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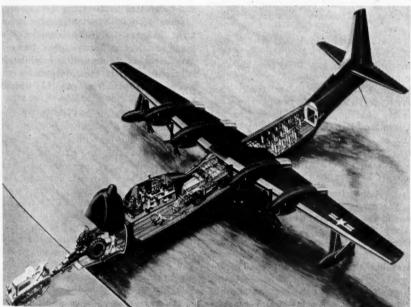
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Reconnaissance aviation has become increasingly vital. Here lies the area in which tactical air forces must perform a exploitation as the true offensive role for the field army rests squarely on troop and cargo transport aircraft capable of landing and taking off from relatively unimproved land and water areas.

Service interests concerning tactical air forces must be subordinated. The type air support outlined is required by atomic ground forces and must be provided.

Naval Support

Skeptics quickly will point out that the risks to the sea forces required to support



The Convair Flying LST

gigantic task in providing the ground commander with reliable and timely information far beyond the range of surface reconnaissance means.

Air transport has an increased role in providing for the swift movement of personnel and supplies and the evacuation of the sick and wounded. The concept of the an operation such as the one being proposed will preclude their use.

They will cite the danger of threading a large naval force through the Yellow Sea and Korea Bay. The risks are there. But are they there to the degree imagined by some? Are they there on the basis of World War II thinking or world war III thinking? In establishing the strategic setting for a field army size unit in exploitation, it was pointed out that during the nuclear exchange (in which naval forces will participate heavily) the Communist strategic atomic and thermonuclear delivery capabilities would have to be destroyed. This will include his missile sites and his strategic air forces. Air superiority will be won in the process. Under these conditions the allied navies will rule the seas and can dominate the land areas which form the strategic watergates of the world for the length of time necessary to assure passage of allied forces.

It will be seapower, linked directly with transport airpower, both moving freely, that will divorce land forces from the antiquated logistical support system upon which we are now dependent. Water leads most everywhere in the world where our forces need to go. Water leads from the US to Manchuria. With the ability to control or neutralize land areas forming critical watergates in between, we can move with relative impunity and at a cost (and a risk) far less than overland movement.

Conducting the Exploitation

The conduct of the exploitation can be considered to begin when the Strategic Army Forces depart the CONUS and Canada for the theater of operations. However, to focus quickly on the ground action, visualize the period just preceding the breakout from the airhead-beachhead. Keep in mind that the original outline plan based on the commander's first decision or series of decisions has been constantly refined, evaluated, and adjusted. This process continues until firm operation and administrative orders have been approved, produced, and distributed. This is done at the latest possible time which will still allow all units to prepare for action properly. In spite of this, the operation probably will not adhere to the prepared plan.

An operation of this type will rely heavily on fire, maneuver, and shock action. All three must be delicately interwoven and controlled to break out of the airhead-beachhead quickly with a violent blast of tactical atomic weapons.

The main attack must be carried by one powerful corps. This main attack probably will have to be shifted from one corps to the other as the exploitation progresses in order to maintain the speed and continuity of the attack.

One of the greatest dangers to this force can be created by diverting fighting units to deal with unimportant enemy formations or areas. Carefully calculated risks must be taken in bypassing all forces of insufficient size to prevent accomplishment of the mission. If these formations cannot be tolerated in our rear, they must be atomized.

Communications must keep pace. Resupply must depend primarily on hastily erganized air and land lines of communications. The control and care of civilians will present staggering problems. These people must be won over to our cause. This will minimize unnecessary drain on our force. Prisoners of war will be taken in untold thousands. Hundreds will be dying from overexposure in radioactive areas. These problems must be planned for and dealt with. Our own casualties will present real problems to a fast-moving force. Engineer support will be essential to maintain the momentum of the exploitation.

The pursuit must be pushed to the utmost limit of endurance of the troops and equipment. The danger lies in slowing down or stopping. A force this size moving at the speed visualized will strike terror into the enemy high command. The stories about the unit will far exceed its feats and if strategic psychological warfare is coupled with an assault of this type, the results will be amazing. Many of the problems that World War II skepties

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this y of ties Airborne and helicopterborne forces can be used as or in conjunction with encircling forces to help contribute to this quick victory. After the breakout the VII Airborne Corps should be withdrawn from action and reconstituted as a strategic threat against the entire theater. Its next decisive use should, perhaps, be to isolate the Harbin area shortly before the arrival of land forces. However, this should not prevent its use to seize any important intermediate objectives within the capability of the unit.

The question of the territorial responsibility which army has had in the past must be answered. It is not visualized that all the land between the assault area and the objective area will be under army control. The army rear boundary must be tucked in close. There will have to be an advanced support section of some type in the Dairen Peninsula, but it is not visualized that territory will be taken over from army by a communications zone as was done in World War II.

A word about high command—higher than army. Army groups probably will still have a place on the battlefields of the future. But field armies will never again line up shoulder to shoulder within the army group to fight. It is beyond the scope of this article to attempt a discussion of how the army group would function. Obviously, in the situation explained there would be a requirement for control above army level. An army group headquarters could provide this control.

Conclusions

- Thermonuclear firepower delivered by planes, missiles, and ships will create the strategic opportunity for exploitation by ground forces.
- 2. Given adequate warning before the nuclear exchange, large ground formations can survive the onslaught. They will then be the decisive force in securing the victory that can be achieved as a result of the decisive strategic battle which will be launched by the sister services.
- 3. In all-out thermonuclear world war the offensive form of ground warfare, from the army commander's point of view, will be the exploitation.
- 4. The conditions under which the exploitation is undertaken will be such that the main problems may well be administrative and logistical instead of tactical.
- 5. Airpower linked to seapower will be the means of solving these administrative and logistical problems once the operation is launched.

Although we are stressing the development of atomic weapons, missiles, and rockets, we are not overlooking the importance of continued improvement of conventional weapons which are urgently needed for the accomplishment of countless specific tasks with which a field army is faced. In any situation that might develop, you can be sure the Army will have the means at hand to apply the exact amount of force required—from the silent thrust of a bayonet to the blast of a powerful guided missile.

Secretary of the Army Wilber M. Brucker

MAO TSE-TUNG AS A GUERRILLA A SECOND LOOK

Walter Darnell Jacobs

THERE is no shortage of commentary on the value of Mao Tse-tung's theory of guerrilla warfare. By some sort of tacit agreement, westerners now accept Mao as the father or at least as the perfector of guerrilla warfare in its modern application.

This agreement deserves a second examination.

First, it should be noted that what Mao was writing about in most cases was not guerrilla warfare but yu chi chan. This expression is derived from the root words for (1) travel, roam; (2) strike, attack, rout; and (3) war, battle. The translation "guerrilla warfare" may be a convenient one but it can hardly be viewed as completely accurate.

Association With Chu Teh

Second, it should be noted that Mao's reputation rests on the later success of the Chinese Communists and on Mao's association with Chu Teh. The success of the Chinese Communists is due to a number of factors, not excluding, but not exclusively, guerrilla warfare.

Mao's collaboration with Chu Teh is the basis for a great number of western commentaries on Chinese concepts of guerrilla warfare.

Chu Teh's early history includes training at the Yunnan Military Academy, a sojourn in Germany (from where he was expelled by the government), a period as

an opium addict, and a habit of selling his sword to the highest bidder.

In May 1928 he combined forces with Mao Tse-tung. The Chu-Mao combination did much to put the Communists in power in China. It provided history with an elaborate example of the supposed unity of theory and practice in that Chu and Mao not only articulated a theory of irregular warfare but executed that theory.

It is suggested that the picture of Mao (and of Chu) as father of a new or universal theory of irregular warfare is as erroneous as the earlier acceptance of Mao and his band as agrarian reformers.

Historical Influences

Western writers have indicated that a number of historical influences had a bearing on the framing of the Chu-Mao concept of irregular warfare.

In her book, The Great Road: The Life and Times of Chu Teh, Agnes Smedley cites the influence of Sun Tzu, of the Chinese and Mongol armies of ancient times, and of the Taipings. She recalls that Chu Teh quoted with approval the advice of an old Chinese bandit, who was known as Old Deaf Chu, to the effect that "You don't have to know how to fight; all you have to know is how to encircle the enemy." Miss Smedley maintains that there

Mao Tse-tung's theory of guerrilla warfare was based largely on recognizing the peculiarities of the time and place in which he operated, and in adapting his theory of irregular war to the existing situation

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¹These summary remarks on Chu Teh are based on The Great Road: The Life and Times of Chu Teh. Agnes Smedley, Monthly Review Press, New York, 1956. vassim.

was little or no Russian influence on Chinese Communist strategy and tactics.

According to Robert Elegant, "the first textbook on large-scale partisan warfare" which was used by Chu was "a short work on the tactics employed by General George Washington." Mr. Elegant continues that Washington's example was particularly apt, because Chu Teh, too, was fighting with inferior forces for the establishment of a new form of government against an unenthusiastic enemy. Since Washington and his Continentals had modeled their tactics on those of the American Indians, presumably of Asian origin, the lesson had come full circle.

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According to Haldore Hanson, the fabulous T. E. Lawrence exerted his influence. Mr. Hanson visited the headquarters of General Lu Cheng-ts'ao, the commander of the Central Hopeh guerrillas. In Humane Endeavor, the Story of the China War, Mr. Hanson reports that General Lu had a Chinese translation of Seven Pillars of Wisdom in his tent and that General Lu and other commanders in China considered Lawrence's work "one of the standard reference books on strategy."

Robert Payne says that Mao Tse-tung and Lawrence of Arabia are the only scholar-soldiers who have fought and won extensive guerrilla campaigns in recent history. In his book, Mao Tse-tung: Ruler of Red China, Payne adds, however, that:

When the Chinese Communists were told of his [Lawrence's] exploits, they were tempted to disbelieve their informant, as though guerrilla warfare was their own invention, the legacy of the 222 wars fought in the 'Spring and Autumn Period' and the countless Chinese wars which followed.

Washington, Lawrence, and Old Deaf Chu all may have influenced the Chu-Mao concept of irregular warfare although there is no readily discoverable evidence to indicate that any of them had an overriding influence. A study of the writings of Mao and of the imitative writings of other Chinese Communists prominent in military affairs—such as Chu Teh, Nieh Jung-chen, P'êng Têh-huai, Kuo Hua-jo, and others—indicates that the important influences on the Communist concept of irregular warfare were the situation and the terrain. These influences are clearly evident in the writings of Mao.

Guerrilla Warfare and Environment

Mao emphasized the peculiar Chinese character of his concept in an essay, "Strategic Problems of China's Revolutionary War," in Volume I of his Selected Works. He criticized three groups which did not understand that China's revolutionary war "is waged in the special environment of China."

The first group "declare(s) that it is enough to study merely the laws of war in general..." Mao maintained that the laws of war in general should indeed be studied, but "although we must cherish the experiences acquired by people in the past at the cost of their blood, we must also cherish experiences at the cost of our own blood."

The second group suggested that "it is enough to study Russia's experiences of

²Robert S. Elegant, China's Red Masters: Political Biographies of the Chinese Communist Leaders, Twayne Publishers, New York, 1951, p. 82.

Mr. Walter Darnell Jacobs was on active duty in the Army from 1942 to 1953. A graduate of the Army Language School (Russian Course) he received the Master of Arts degree in Political Science from Columbia University as well as the Certificate of the Russian Institute in 1956. He is the author of "A Soviet Attack Capability," and "What Does the Soviet Officer Read?" which appeared in the December 1956 and February 1957 issues of the MILITARY REVIEW. Until September 1957 Mr. Jacobs was associated with the Library of Congress where he was responsible for the Exchange Program with libraries and institutions in the Soviet Union. He now 18 studying on a Ford Fellowship at Columbia University.

revolutionary war..." "They do not see," said Mao, "that these laws of war and military directives in the Soviet Union embody the special characteristics of the civil war and the Red Army of the Soviet Union." He added that "there are a great number of conditions special to the Chinese revolution and the Chinese Red Army."

The third erroneous group wanted to base its theory on the Northern Expedition of 1926-27. Mao rejected this theory as he contended "we should work out our own measures according to our present circumstances."

Mao summed up the peculiarities of his concept and its design for the situation and terrain in China as follows:

Thus the difference in the circumstances of wars determines the difference in the guiding laws of wars: the differences of time, place, and character.

In studying the guiding laws of war of different historical stages, of different characters, of different places, and of different nations, we must keep our eyes on their respective characteristics and their development, and must oppose a mechanical approach to the problem of war.

Basic Principles

Mao stresses that the basic principles of guerrilla warfare can be summarized in the famous slogans of the Chinese Communist Forces:

- 1. Enemy advances, we retreat.
- 2. Enemy halts, we harass.
- 3. Enemy tires, we attack.
- 4. Enemy retreats, we pursue.

These slogans consist of four Chinese characters each. In an attempt to capture a similar pattern in the English translation, this somewhat awkward form has been produced.

These statements—as well as the influence of time, place, and character—have been elaborated by Mao in "Strategic

Problems in the Anti-Japanese Guerrilla War," Volume II, Selected Works. This essay is presented as an effort concerning the anti-Japanese war and is not intended as positing general rules for guerrilla warfare. There are, in fact, six specific problems of the anti-Japanese war which are discussed as problems peculiar to the time and place considered by the essay. In addition, Mao, from time to time in the course of the essay, permits himself to speak of warfare in general terms. Since Mao is at such pains to distinguish between the specific and the general, it is only fair that the two not be confounded and a sincere and continuing attempt has been made in that direction in this study.

Specific Problems

As pointed out by Mao in Volume II, the specific strategic problems of the anti-Japanese guerrilla war are:

- 1. On our own initiative, with flexibility and according to plan, carry out offensives in a defensive war, battles of quick decision in a protracted war, and exterior-line operations within interiorline operations.
 - 2. Coordinate with regular warfare.
 - 3. Establish base areas.
- 4. Undertake strategic defensive and strategic offensive.
 - 5. Develop into mobile warfare.
- Establish correct relationship of commands.

While describing and developing these six specific problems in the essay, Mao elucidates the following general principles:

- 1. Conservatism in guerrilla warfare must be opposed.
- 2. The principle of preserving oneself and annihilating the enemy is the basis of all military principles.
- 3. Guerrilla warfare is different from regular warfare only in degree and in form of manifestation.
 - 4. The basic principle of guerrilla war-

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5. The offensive is the only means of annihilating the enemy as well as the principal means of preserving oneself, while pure defense and withdrawal can play only a temporary and partial role in preserving oneself and are utterly useless in annihilating the enemy.

Undoubtedly, P'êng Têh-huai thought he was reproducing Mao's thoughts when he told Edgar Snow, "Partisans must not fight any losing battles." ^a

Analysis of Specific Problems

Mao's statements and their mirrorings by such as P'êng are more than blandness. For example, the first specific strategic problem places the task of carrying out offensives in a defensive war and of conducting exterior-line operations within interior-line operations. In an exterior-lines situation principal communications and land are held and the troops are somewhat dispersed. In an interior-lines situation less space is held, the forces are usually encircled, they are more centralized, and hence more easily concentrated.

The anti-Japanese war was purely a defensive one from the Chinese Communist viewpoint and the Communists clearly were weaker than the Japanese. Had the Communists adopted a defensive approach under such conditions, one of two situations would have resulted—the adoption of positional defenses, or the abandonment of opposition to the Japanese. Either situation would have been fatal to the political and military plans of the Communists.

The problem of coordinating guerrilla warfare with regular warfare is viewed by Mao as a problem peculiar to the time and area of the anti-Japanese war. In earlier situations there had been no regular warfare with which to coordinate. In

The establishment of base areas seems, at first glance, to be incompatible with the concept of guerrilla warfare (or to be more nearly exact, yu chi chan). Mao maintains that guerrillas without base areas are roving insurgents and can have no connection with the political aspirations of the indigenous population. The thoroughly political character of Mao's theory makes such a concept anathema. While serving a political purpose, the base area also serves a definite military purpose. They usually were located in the mountains, for obvious military reasons, although Mao did not rule out plains areas. Chu Teh has given a description of the military role of the base areas in his remarks concerning the Wutai mountains area. He said:

Our regulars can return to such bases for rest, replenishment, and retraining, guerrilla forces and the masses can be trained in them, and small arsenals, schools, hospitals, cooperative and regional administrative organs centered there. From these strongholds we can emerge to attack Japanese garrisons, forts, strategic points, ammunition dumps, communications lines, railways. After destroying such objectives, our troops can disappear and strike elsewhere.

In counseling the guerrillas to undertake strategic defensive and strategic offensive, Mao merely is saying that there will be an alternation of periods during which the guerrillas will be now on the defensive, now on the offensive.

The injunction to develop into mobile

later situations, when guerrilla warfare had transformed itself into mobile warfare and into regular warfare, there would be no guerrilla warfare to be coordinated. The concurrent existence of regular warfare and guerrilla warfare made such coordination possible and, being possible, necessary at this specific time.

⁸ Edgar Snow, Red Star Over China, Random House, New York, 1938, p. 276.

⁴ Smedley, op. cit., p. 360.

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warfare goes to the heart of the Mao concept. He views guerrilla warfare as a prelude to regular warfare. The guerrillas will be transformed into regulars. In the best Marxian sense, Mao holds that by increasing their numbers and improving their quality guerrillas will transform themselves into "a regular army which can wage a mobile war."

Discipline Required

The establishment of the correct relationship of commands is synonymous to the establishment of discipline. Guerrilla units traditionally have been notable for their lack of discipline to the disdain and discomfort of commanders at successively higher levels. Mao has maintained elsewhere that "it [discipline] should increase with the size of the unit." Mao is calling for better command control while, at the same time, trying to avoid the restriction of the very essence of the guerrillas—their mobility.

The elimination of the six specific problems of the anti-Japanese guerrilla war leaves little of a universal nature in the famous Mao essay. The general principles listed here are of such a nature as to make further discussion redundant. Most analyses of Mao's writings on guerrilla warfare give a prominent place to "Strategic Problems in the Anti-Japanese Guerrilla War." This is as it should be for this is Mao's most important work on yu chi chan. However, they almost uniformly ignore Mao's own caution that the principles discussed apply to a distinct historical moment and to a definite geographical location. If the strategy and tactics which Mao adopted in the anti-Japanese war are applicable elsewhere, that applicability would seem to contradict Mao's reiterated warning that every historical stage and every geographic site must be considered separately. It is not Mao Tse-tung

Basis of Theory

Mao's contribution was not so much in providing war with "scientific" schemata as it was in recognizing the peculiarities of the time and place in which he operated and in adapting his theory of irregular war to the existing situation.

His theory of war, as outlined in Volume II, was based on the statement that "Every Communist must grasp the truth: 'Political power grows out of the barrel of a gun'." He maintained that "In China, without armed struggle the proletariat and the Communist Party could not win any place for themselves or accomplish any revolutionary task." His concept of irregular warfare evolved from these assumptions.

Guerrilla warfare was never suggested by Mao as a desirable or eternal form of war. He freely and frequently deprecated it. In 1936 he said:

(T)his guerrilla character is precisely our distinguishing feature, our strong point, our means for defeating the enemy. We should prepare to discard this character, but we cannot yet discard it today. Someday this character will definitely become a thing to be ashamed of and therefore to be discarded, but today it is invaluable and must be firmly retained.

Conclusion

Mao made a virtue of necessity. His theory of warfare, in general, and his theory of irregular warfare, in particular, were adapted to the circumstances of his time and place. The success which crowned the efforts of Mao and the Chinese Communists should not induce observers to discover elements which are, in fact, not there. Mao's theory has universal applicability only in its repeated warnings that every situation must be considered in the frame of its historic development and geographic setting.

who urges that Chinese Communist concepts of guerrilla warfare be imitated elsewhere.

⁵ Quoted in Lieutenant Colonel Robert B. Rigg's Red China's Fighting Hordes, The Military Service Publishing Co., Harrisburg, Pa., 1951, p. 226.

THE EVOLUTION OF ARMORED TACTICS

Richard M. Ogorkiewicz

PROGRESS made in tank design generally is tangible and readily recognized. Tank tactics, on the other hand, are more elusive and their progress apt to escape attention. Nevertheless, over the years, advances as important as those in tank design have taken place in tactics and their evolution is of considerable interest, both from the point of view of an appreciation of the ground already covered and the current position of armor.

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The tank was born during World War I in an atmosphere of continuous fronts and static, almost siege-like conditions. It was natural, therefore, that its original method of employment should have been in frontal assaults.

The first such assault, delivered by British tanks on 15 September 1916, actually was executed by advancing behind a rolling artillery barrage and just ahead of the attacking infantry; the principal task of the tanks was the destruction of machinegun nests which survived the artillery bombardment. Although the tanks were too few and too scattered to score a major success, their first action set a pattern for the simplest form of employment in a conventional artillery-infantry assault.

From the frontal assault and the shallow penetration which it produced, the employment of tanks graduated to the tactical breakthrough. This was accomplished by British tanks at Cambrai in 1917 and at Amiens in 1918, in each of which over 300 fighting tanks were used over rela-

tively narrow fronts. This saturated hostile defenses with more tanks than they could possibly cope with. Moreover, every attempt was made to secure surprise and the usual long artillery bombardment, which had hitherto heralded every major offensive, was not employed. The considerable concentrations of artillery, amounting to almost one gun to every 10 yards of the front, opened fire just prior to the tank assault and engaged primarily on counterbattery work. Tanks destroyed the barbed wire belts in front of the hostile trenches and strong points, opening the way for the infantry which followed closely behind the single wave of assaulting tanks, one tank to every 40 or 70 yards of front.

"Plan 1919"

In both cases a breakthrough of the hostile defense lines was achieved but the over-all success was limited through lack of suitable means of exploitation: horse cavalry could make no headway even against a few scattered machineguns and the existing tanks were too slow and had a very limited operating range. However, with the development of faster medium tanks a means appeared both for exploiting the success of the heavy assault tanks and of elaborating the assault technique. Both features were embodied in the "Plan 1919" presented by the chief of staff of the British Tank Corps, General J. F. C. Fuller, and approved in principle by the Allied commander in chief. In essence the

Progress in tank design is tangible and readily recognized. Important advances in design also have taken place in tank tactics and a study of their evolution forms a background for development of future tactics

plan envisaged an extension of the tank assault by sending platoons or companies of fast Medium D tanks through the hostile lines to attack hostile command posts. The heavy tanks were to assault frontally and open the way for the bulk of the medium tanks, followed by truckborne infantry, to exploit the breakthrough.

World War I came to an end before "Plan 1919" could be put into effect. An elaboration of the frontal assault tactics evolved by the French Army met a similar fate. Its principal feature was a division of roles in the assault between tanks leading it and those which followed shepherding the infantry, and the creation of two corresponding categories of tanks. The Renault F.T. light tanks, well-suited to accompanying the infantry, already existed. For the leading role in the breakthrough the French were building powerful 76-ton 2C tanks which were twice as heavy as any of the contemporary British tanks.

Use of Light Tanks

Something of this assault technique actually was foreshadowed in the proposed 1918 organization of the US tank brigades which were to consist of one battalion of British type heavy tanks and two of French type light tanks. This concept was perpetuated after World War I in the existence of US tank units equipped with the British-designed Mark VIII heavy tank and the Renault-inspired M 1917 light tanks. The French, however, built

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only 10 of the 2C heavy tanks and after the war, as methods of trench warfare were gradually supplanted by ideas based on more open fighting, the heavy breakthrough tank fell into neglect.

This left the field to the light infantry accompanying tanks which came to dominate it through the twenties and most of the thirties. Having originated them and saddled with a stock of approximately 3,000 Renault F.T's., the French Army was the chief exponent of this type tank. However, due partly to its low cost and the fact that it formed the basis for established concepts, it also was adopted by most other armies.

The typical method of employment of light tanks was the attachment of a battalion to an infantry division and the allotment of one tank company to each assaulting infantry battalion. The normal tank company front was 300 to 600 yards advancing in a single wave slightly ahead of the infantry. The employment of the accompanying tanks was tied closely the foot-fighting infantry—being governed by the speed and endurance of the latter—and their principal task was to neutralize hostile automatic weapons holding up the advance of the riflemen.

Heavier Tanks Employed

The capabilities and effectiveness of these tanks were extremely limited and after a time the concept of leading an attack with more powerful tanks regained strength. This time, however, they were no longer called breakthrough tanks. Instead, the new or revived category of more powerful tanks was collectively designated by the French Army as the chars de manoeuvre d'ensemble, which corresponded roughly to the contemporary US Army concept of leading tanks and which were best exemplified by the French type B heavy tank of the thirties.

Like the light accompanying tanks, these more powerful tanks were used by

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companies or battalions but not in such close contact with the infantry units. Moreover, instead of being subordinated to small infantry units, these tanks were committed under divisional or corps control along the main line of effort. Being better armed and better able to stand up to punishment, they generally moved ahead of the light infantry-accompanying tanks, destroying enemy heavy weapons, antitank guns, and tanks.

Tactics such as these, based on two tank echelons, became the pattern for the more advanced type of employment of tanks in frontal assaults in conjunction with the infantry, even where two separate categories of tanks were not available. In either case, the basic feature was the echeloning of tanks in two waves, the first penetrating as quickly as possible to the objective and dominating it, and the second remaining close to and leading the infantry.

Early Russian Tactics

The Russians went one better than the French. During the thirties they adopted a similar tactical system but incorporated some of the raiding tactics proposed in 1918 for the British Medium D tanks. Thus in contrast to the two categories of French tanks, the Russians had three. First, they had the N.P.P., or close infantry support tanks whose role corresponded to that of the chars d'accompagnement and which were typified by the divisional light tank battalions. Then they had the D.P.P., or distant support tanks which corresponded roughly to the chars de manoeuvre d'ensemble and which were supposed to attack more deeply and more independently of the infantry. Finally, there were the D.D. tanks which were supposed to penetrate rapidly and deeply into the hostile defensive zone to attack command posts, artillery, and reserves.

The Soviet tank tactics of the thirties represented the most highly developed

system derived directly from the methods of World War I and the most elaborate form of tank employment under the control of infantry. In theory, the tactics did envisage attacking with tanks the entire depth of the hostile defensive system and the D.D.—and to a lesser extent the D.P.P.-tanks were able to operate more independently and make better use of their mobility. However, the over-all tempo and depth of the attack were still governed by the foot-fighting infantry. Moreover, although the use of up to two tank brigades in support of one infantry division was contemplated, tanks were not used in mass but were parceled out by companies or battalions to infantry units. Thus although tank brigades or even tank corps existed, they hardly operated as such in battle, and their staffs, like those of the British tank brigades in World War I. were little more than advisory bodies to infantry commanders.

British Develop Mobile Methods

While the French and the Russians were elaborating tank tactics aimed at penetrating continuous static fronts and closely tied to the infantry, the British took the lead in developing more independent and mobile methods. Field experiments were initiated in 1927 and the development took a large step forward with the formation of a tank brigade as an operational—and not merely administrative—unit. This became the first instance of massed mobile employment of armor with as many as four tank battalions maneuvering together under one command.

The tank brigade of the Royal Tank Corps consisted only of tanks—light tanks for scouting, medium tanks for attacking, and howitzer-armed tanks for establishing protective smokescreens. Plans for the operation of the tank brigade envisioned its use as a mobile force against hostile flanks or rear, in harassing raids, and in exploitation. In the absence of convenient

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openings or flanks it was to operate through gaps made for it by other units. The employment of the tank brigade was, therefore, limited to favorable circumstances. No doubt it could have created havoc shooting up hostile rear installations, as the Medium D would have done in 1919, but it could not achieve decisive results unaided. Equipped only with tanks, and not very powerful tanks at that, and devoid of other arms, it could not perform more than a limited mobile role. Similar reservations applied to the first US mechanized formation, the 7th Cavalry Brigade of the thirties, and to the Soviet mechanized brigades of the period when they were being used in a cavalry role and not in breakthrough operations.

As a first step toward a more mobile employment of tanks the assumption by the early armored formations of the limited horse cavalry role was sensible enough. But there was no reason why the scope of armored formations should not be extended gradually. Instead, what happened in Great Britain, for instance, was that an arbitrary division was drawn between offensive operations against strongly held enemy positions and mobile operations. Troops were divided accordingly into two parallel categories: the tank brigade was assigned to the limited mobile role and a special category of heavily armored "infantry" tanks were to be used by battalions in simple frontal assaults in close support of the infantry.

Panzer Divisions

In consequence, it was in Germany and not in Britain that the next step was taken in the evolution of armored tactics, beyond the confines of the limited mobile role. In essence, the Germans combined the functions of penetration, on which the French and Soviet armored forces had concentrated, with mobile exploitation in a single type of versatile armored formation—the Panzer division.

To the extent that its organization and employment were based on a tank brigade and in its general mobile character, the Panzer division followed the course set by the British tank brigade. However, the Germans expected more of the Panzer division than a limited mobile role and they recognized that tanks alone were insufficient to achieve decisive results. In consequence, they backed the tank brigade of the Panzer division with a motorized infantry brigade which would follow and complete the work of tanks or assist their passage through obstacles. They also added other arms and produced a mobile division which had both greater striking power and greater mobility than other contemporary formations of comparable size and which was capable of obtaining a decision in battle or of mobile exploitation.

In some other respects the contemplated use of the Panzer division on a narrow front against strong hostile defenses also resembled the contemporary Franco-Soviet doctrines at their best. The differences were, however, greater than similarities. For example, under the German system tanks were not parceled out among infantry units but were concentrated under one command. In addition, the tempo of operation was geared to the speed of tanks and not to that of the foot-fighting infantry.

Panzer Tactics

The actual method of operation planned for the Panzer division on the eve of World War II was an attack by its tank brigade of four tank battalions of more than 300 tanks on a front of 3,000 to 5,000 yards. The tanks were echeloned in depth in several waves and, in theory, each main wave was assigned a specific task, such as penetrating to attack hostile command posts and reserves, attacking hostile artillery, or neutralizing hostile infantry positions until the arrival of the Panzer division's infantry echelon.

The success of the Panzer division depended on the firepower of the tank brigade and the speed with which it attacked. The rapid tempo of the attack gave a minimum of time to hostile defenses and the concentration of the tank brigade on a narrow front ensured saturation at the point chosen for the breakthrough. This accomplished, an even more rapid followup enabled the Panzer divisions to convert a tactical breakthrough into a major strategic success. To achieve this high overall tempo of operation and to make full use of their mobile striking power the Panzer divisions did not, as a rule, wait for infantry formations to open the way for them but attacked on their own, opening the way through obstacles with their own infantry and engineers where necessary.

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Normally, the organic motorized infantry, or Panzer grenadiers as they were lated called, followed closely on the heels of the massed tanks, their task being to mop up resistance bypassed by tanks and, together with antitank guns, to consolidate the success. They followed tanks in their vehicles as long as possible but being equipped with trucks were required to dismount and move into action on foot whenever they encountered hostile fire. However, beginning with the 1940 French Campaign, part of the infantry was equipped with armored personnel carriers which enabled that portion of it to work closely with tanks while the remainder, still equipped with trucks, was relegated to a less mobile and more passive followup role.

For the sake of speed the participation of the artillery in an armored attack was remolded also, the customary and comparatively slow massed artillery preparation being dispensed with and, whenever necessary and possible, replaced by the far more rapid massed dive bomber attacks. The mission of the relatively small artillery component of the Panzer divisions was to concentrate on selected targets inaccessi-

ble to, or most dangerous to, tanks—such as hidden antitank guns.

Versatility of Panzer Employment

These tactics applied to the Polish, French, Balkan, Russian, and Libyan Campaigns of the 1939-42 period, in which the Panzer divisions played a leading and decisive role. When the tide of war turned against Germany and opportunities for large-scale offensive operations passed, the principal role of the Panzer divisions became that of delivering swift and powerful counterblows against hostile penetrations. As the general situation deteriorated, the Panzer divisions became the backbone of the German defense. They defended critical sectors, holding key points with their infantry and counterattacking with their tanks, and conducted delaying defense in small mobile battle groups.

The far-reaching extension of the role of the Panzer divisions during the course of World War II emphasized their versatility and contrasted sharply in 1940 with the French tactical system. The French battalions of light infantry-accompanying tanks were scattered over a wide front, the chars de manoeuvre d'ensemble grouped in the divisions cuirassees but used equally in penny packets. The mechanized cavalry divisions also were used separately and defeated piecemeal. A year later Soviet armored forces organized in a manner similar to the French met the same fate. When the Germans struck, the Russians were trying hurriedly to organize tank divisions on the model of the Panzers, but their methods-if not their organization-still were rooted in the earlier system.

Both the Soviet and French systems compared badly with the logical simplicity of the German methods of concentrating all the available tanks in the Panzer divisions and the Panzer divisions at the decisive points. They might have achieved

a limited degree of success had they been given favorable static conditions, but with their overspecialization and complication they failed under the mobile conditions imposed by the Germans.

Changes in Soviet Tank Tactics

The heavy losses of 1941 resulted in the Soviet armored forces retracing the general course of armored tactics. Thus they reverted to the system of straightforward frontal assaults with small tank units leading the infantry. Necessity became a virtue and the official doctrine became that of close cooperation with other arms.

From frontal assaults Soviet armored forces graduated to progressively deeper penetrations and from tactical breakthrough to mobile exploitation and envelopment on a strategic scale. In the closing stages of World War II in Europe the rate of advance of Soviet armor approached that of the German Panzer divisions in 1940 and 1941, and in Manchuria, in August 1945, it exceeded it by a dash of some 700 miles in five days through collapsing Japanese resistance.

The breakthrough which preceded the mobile exploitation was created at times by infantry divisions supported by massed artillery and independent tank units, but on other occasions Soviet armored formations penetrated on their own. In such cases they attacked with 200 to 300 tanks on a narrow front of 1,500 to 2,000 yards, usually in three main waves, preceded by artillery preparations lasting several hours.

Employment of Heavy Tanks

Against strong enemy defenses both the Russians and the Germans led on occasions with heavy tanks. More often, however, heavy tanks followed medium tanks supporting them with their heavy long-range guns. Thus the role of the more powerful tanks was transformed gradually from that of heavily armored assault vehicles

to lead the breakthrough to that of heavy gun tanks supporting the medium tanks. This transformation was initiated by the tactics of the German Pz.Kpfw.IV medium tank in relation to the lighter German models before World War II, and completed with the use of Tiger and Stalin heavy gun tanks within German and Soviet armored formations.

The powerful heavy tanks such as the Stalin played a particularly important role in meeting hostile armor, an event considered unusual in the early days of armored forces but later increasingly frequent and important. Equally important in meeting hostile armor were the heavy S.U. assault guns or turretless tanks. On such occasions Soviet medium tanks usually tried to retire and to maneuver on the flanks leaving the fire fight to the less mobile but more powerful heavy gun vehicles.

Use of Infantry

In contrast to the effort which the Russians devoted to heavy gun vehicles and the progress they made in increasing the direct mobile firepower of their armored formations, they remained well behind in the effective mobile employment of infantry in conjunction with tanks. Their method was to mount infantry on tanks, usually those of the second and third waves, and it was only after World War II that they produced an armored infantry carrier.

Nevertheless, in the final stages of World War II Soviet armored formations closely approached the standard set earlier by German Panzer divisions as the decisive element in ground warfare, capable of obtaining a decision in battle and of mobile exploitation. Their ideal became a massed attack on a narrow front delivered by several waves of tanks echeloned in depth, an attack which would smother hostile defenses by its mobile firepower and minimize counteraction by its

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Tank and Infantry Teams

By the end of World War II, however, this particular form of employment was being superseded by other more flexible methods based on closer cooperation between different arms in smaller tactical groupings.

The changeover from the earlier tactical system based on the offensive employment of entire armored divisions to the more flexible methods using smaller closely knit teams of several arms took place gradually in all the major armies. For instance, for 11 years after World War II British armored divisions retained an organization based on a separate tank and infantry echelon, although in 1944 British armored divisions fought in mixed tank-infantry brigade or battalion groups. To the end of World War II British official doctrine still insisted on confining armored divisions to the role of exploitation, leaving the harder tasks of fighting and breaking through to infantry divisions and the special "infantry" tank units. The latter practice of retaining tank units outside armored divisions for use with infantry divisions was not, of course, confined to the British Army. Both the Soviet and US Armies-but not the German-practiced it in the latter part of World War II but neither went to the extreme of specialized "infantry" tanks nor drew such sharp distinction between the two roles.

British System Complicated

The British system of the two separate and distinct categories of tanks proved unnecessarily specialized and complicated. Like the earlier French and Soviet systems it might have worked if given reasonably static, and favorable conditions

and a wealth of equipment. Under average conditions it meant a dispersion of tank effort between two separate categories, ill-suited to cooperating with each other and, as happened in Libya in 1942, subject to piecemeal defeat. It is noteworthy that the more successful German methods were evolved in an atmosphere of limited resources and that the concentration of all the available tanks in the Panzer divisions and the use of the Panzer divisions in a variety of roles was based on the principle of making the most of available resources.

The World War II British doctrine that armored divisions should be retained for exploitation after the enemy had been defeated was an unjustified and unworkable luxury. In practice, British armored divisions proved fully capable of participating in the different phases of fighting. Any shortcomings which they might have displayed were not fundamental but due to avoidable handicaps such as the design principle of undergunned mobility. The undergunned tanks proved a particular handicap in Normandy in 1944. Here, three British armored divisions were used in a series of frontal attacks, but in spite of the handicap they managed to pin down the bulk of German armor and thus help the breakthrough by US forces on the right flank of the Allied bridgehead.

Early US Doctrine

The doctrine with which US armored divisions entered into action was somewhat less inhibited than the British. Between 1940, when the first US armored divisions were activated, and 1944, when the majority of them was committed, there was a definite trend toward limiting their role to exploitation. In practice, however, this doctrinal tendency to regard armored divisions as a single-purpose arm proved unfounded and unworkable. They engaged in many different types of operations, even taking part in attacks against permanent

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fortifications, although, as German armored force manuals pointed out several years earlier, this was a wasteful form of employment if other less mobile divisions were available.

In the variety of operations in which US armored divisions participated the predominant tactical form consisted of mixed subdivisional groupings of several arms. This organization also applied to British armored divisions during the latter part of World War II and to the German Panzer divisions which actually pioneered the system of mixed armored battle groups, or kampfgruppen. However, neither could use it as effectively as the US divisions which had armored half-tracks for their infantry and self-propelled guns for their artillery.

Concept Changes

On the face of it the subdivisional groups of tanks, infantry, and other arms did no more than reproduce the basic pattern of the armored divisions on a smaller scale. However, the processes associated with this miniaturization and its consequences have been far-reaching, particularly in the light of post-World War II developments.

For example, the combination of different arms in smaller groups has made cooperation far more intimate and quicker. It assures more rapid cooperation under fluid conditions of highly mobile warfare over wide fronts. In addition, it ensures the benefits of mutual support whenever the terrain or other conditions prevent the operation of an armored division in one body. Moreover, smaller mixed groups make it easier to change from leading with tanks to leading with infantry, or vice versa, according to the needs of the situation. Smaller, self-contained tactical groups have become essential for dispersion in the face of the destructive power of modern weapons.

The grouping of different arms also has

altered their relative position and roles. Thus the earlier, fairly well-defined separation and cooperation between the tank and infantry echelons of the armored divisions have given way to close integration between the two elements and cooperation between a number of mixed tank-infantry teams. Tanks have ceased to be a distinct assault element, which they were thought to be originally, and, instead, have assumed the more general role of a source of mobile, medium-weight direct firepower within the closely knit weapons system represented by an armored battle group.

The relative position of the infantry also had to alter. Within small armored battle groups it can neither play the role of the dominant element to which tanks are subordinated, as they were in the early days, nor that of a passive follower merely occupying or holding ground, as it was inclined to be in the early armored divisions. Instead, it has to assume the role of an active partner, alternately leading or following, depending on whether the conditions favor it or the tanks.

The smaller, closely knit tactical groupings of tanks and armored infantry have made it possible not only to change more rapidly from leading with one to the other, enabling them to cope with a variety of situations during offensive operations, but also to pass from the offensive to the defensive.

Armor in Defense

Until relatively recently defense has been one of the neglected aspects of armored operations, in spite of several successful examples, notably German, of defense by armor. For many years it has been customary to describe armored units as offensive in character and, by implication, to rule out defensive missions. This outlook was inspired largely by the conception of defense as static rather than dynamic, aimed at holding a particular piece of ground rather than inflicting a maximum of casualties on the enemy and

wresting the initiative from him. From the latter point of view armored units are well-suited to defense. This is particularly true in light of the destructive power of modern weapons which puts a premium on the ability to keep the situation fluid and where prolonged static defense runs the risk of total annihilation. Thus it is unnecessarily restrictive to describe armored forces as only offensive and far better to define them as mobile.

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At the same time, while the close cooperation of different arms in small mixed teams or battle groups has increased their ability to participate in various types of engagements, it also has simplified their form. Obviously, the smaller the unit the simpler must be its tactics. A small battle group could not indulge in trying to attack several successive layers of a hostile defense line simultaneously, as was envisaged, for instance, under the pre-World War II Soviet breakthrough doctrine. There should be no need for such tactics in view of the destructive power of present-day weapons which render obsolete any system of linear defense and its counterpart of a massed breakthrough.

This does not necessarily preclude massed mobile employment of armor and to that extent battle group tactics need not represent a break with the concepts introduced by the German Panzer and Soviet tank armies. However, concentration can no longer take the form of a slow buildup of large homogeneous blocks of men and matériel but calls for the rapid convergence of small mobile fighting teams.

Conclusion

The dispersed concept of small selfcontained battle groups has resulted in armored tactics moving farther away from the original linear character to that of area fighting. With both sides disposed over considerable areas, fighting must tend toward probing, blocking, and infiltrating. This type fighting places greater emphasis on the resourcefulness and initiative of small units rather than elaborate technique but, at the same time, requires that commanders ensure that the dispersion involved in area fighting does not lead to piecemeal defeat and that the multitude of small actions fits into a pattern of overall success.

The azimuth for armor is plain to read. Organizationwise, it points to units in which the mobility and weaponry to achieve tactical self-sufficiency are integrated at the lowest possible echelon, provided with the means for controllability, and given protective skins. We must not be complacent about the degree to which we have already achieved this within our Armored Division. Under the conditions of dispersal and fluidity of situation which we must anticipate in atomic battle, there won't be time to shuffle tactical combinations together to meet the exigencies of the fleeting moment as we have in the past.

General Willard G. Wyman

OBJECTIVE--USA

Major Frank B. Case, Transportation Corps
Terminal and Water Transport Division, Office of the Chief of Transportation

FOR nearly a century and a half no foreign enemy has marched on American soil. The idea of invasion is almost unbelievable to the man in the street, and the military planner finds it difficult to consider the possibility seriously. Enemy ground forces, he points out, would meet the same problems of distance and depth in continental America that western armies would encounter in the great sponge of Russian geography. The enemy could not support his forces. He could gain no decisive objectives. The conduct of ground operations in the United States would be a useless waste of the enemy's resources.

However, the United States presents to prospective invading forces one important difference from the conditions which would face western armies in Russia. Whereas, the Russian heartland is relatively landlocked, the United States has long coasts, adjacent to which are located highly developed political and industrial complexes. As Liddell Hart points out in Sherman, interference with enemy peoples becomes easier as civilization becomes more complex and distribution of comfort more general. The sophisticated economic system that exists in the United States coastal regions provides rewarding objectives for ground force operations. Within these coastal areas, Russia could conduct effective and useful ground operations, on the scale of a strong raid or reconnaissance in force. Under proper conditions, a land invasion on a larger scale would have much to recommend it to Soviet planners.

Conditions for Invasion

The setting for a strong raid would most likely occur during the opening stages of a general war. Admiral Arleigh Burke recently defined general war as a war with Russia. It is an article of national policy that the United States will not intentionally start a war with Russia. Therefore, when an American planner refers to a war with Russia it connotes a war which Russia starts with the intention of involving the United States. The causes which might impel Russia to such a desperate policy do not require discussion here. It is sufficient to assume that circumstances could arise, out of domestic troubles and foreign disappointments, which would force Russia to adopt a war program.

A ground raid or a more substantial invasion of the United States might fit into the Russian scheme for conduct of a general war in three different situations:

- 1. During the period of increasing international tension, before formal declaration of war.
- After formal declaration of belligerency by the United States and Russia, but before nuclear bombardment of the homelands.
- 3. Subsequent to an initial phase of nuclear warfare.

Since full-scale ground invasion or a destructive ground raid on the United States now is within the realm of possibility, plans should be developed immediately to counter such operations if they should occur

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First Condition

During the prewar period of increasing international tension, before final commitment of the United States to general war, a ground operation on American soil could provide Russia the means of provoking the United States into initiating nuclear warfare.

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The primary fear in America seems to be the lightning blow that launches the undeclared war, the atomic Pearl Harbor. In a period of growing tension leading apparently toward war, the specter of an H-bomb sneak attack would loom ever larger in the prospect of national leaders. Mr. Cordell Hull was able to express his outrage to Messrs. Nomura and Kurusu in his office the day of Pearl Harbor. Mr. Hull's successor would be wondering if, after the next Pearl Harbor, he would still have an office. Under these conditions ANY enemy action directed at the Continental United States would be subject to a too-ready interpretation of all-out conflict. Enemy movement toward American shores would be evaluated in the light of the worst that could be expected from the enemy. If Russia wished to launch all-out war, but to place the blame for the first nuclear blow on the United States, the best chance to feint the United States into launching an atomic attack would occur during this period of tension.

Even a relatively small-scale attack would appear to American leaders to be

the opening maneuver of a massive Russian offensive. The temptation to respond by unleashing the Strategic Air Command (SAC) for a nuclear blow on the Russian homeland would be almost irresistible. Although hindsight might show that the assault which triggered the counterattack was no more than a feint—a mere raid—it would be too late for the atomic bombers and strategic missiles to be recalled.

The advantages which Russia would gain from American nuclear reaction to Russian conventional attack would overbalance her losses from accepting the first atomic attack. Those losses would be reduced by the fact that she would be prepared for and expecting the attack. On the other hand, the United States would be cast into the role of atomic aggressor. Russia would gain a valid excuse for immediate all-out attack on the countries where US bases are located, her first objective in a general war. Russian satellites would be convinced that the United States was singly and solely responsible for breaking the moral bonds, which until this time had restrained the world from nuclear warfare, and would stand firmly behind Russia. In the opening stages of a war of ultimate resources, the confidence of America's allies in her good judgment and moral strength would be shaken. Against this battery of canards, the American position would be indefensible-she would have launched a nuclear war for a cause which, in the light of the next day, would be as trivial as that which occasioned the assassination at Sarajevo.

Second Condition

Ground force attack on the United States would offer Russia advantages beyond mere provocation, if the United States and Russia had declared war (perhaps only by way of raising the ante in the international poker game) but were withholding nuclear attack and counter-

Major Frank B. Case is the author of "Beach Operations Under Missiles and Atomics" which appeared in the May 1957 issue of the MILITARY REVIEW. He entered the service in 1941 and was commissioned in 1943. In 1944 he went to Europe with a harborcraft company and remained there on various duties until 1947. He spent five years with the New York Oversea Supply Agency, and served with the Transportation Section, Korea Communications Zone, in 1953-54. He was with the Oversea Operations Division prior to being assigned to his present position with the Terminal and Water Transport Division, Office of the Chief of Transportation.

attack for the time being while their forces were meeting on the ground of a third party.

In a general war initiated without nuclear bombardment, the climate of world opinion would encourage its continuation by conventional means. Influential bodies in every nation would strive to avert allout war by bringing sufficient pressure to bear on the nations already involved, in order to contain the conflict short of Armageddon. Since the nations of the world would be alert to the danger of extension of the war into atomics. Russia would look for a practical means of extending the war in nonnuclear directions and would presume that she would be fairly safe from nuclear retaliation if she did so. During a period similar to the lull which occurred at the beginning of World War II, the mood of the American Government would be one of restraint. Although a reconnaissance in force before the declaration of war might result in an all-out nuclear assault on Russia, a ground invasion of some weight after the declaration of war would be far less likely to be countered with strategic mass destruction weapons, as long as any alternative derense seemed feasible.

The prospect of conducting a general war on a nonnuclear level would be welcomed by American leaders as the alternative to a nuclear holocaust. However, they would find themselves in a critical dilemma. Assuming continuation of current defense policy up to the outbreak of general war, on M-day mobile ground forces-needed both for defense of the United States and for prosecution of conventional warfare overseas-would be available only in the numbers necessary to conduct limited wars. These forces would have strategic value when employed to prevent the expansion of peripheral wars outside Russia and the United States. However, at the onset of hostilities between the United States and Russia, US ground forces would be unable to undertake decisive offensive action against the Russian homeland. Accordingly, United States ground forces would not constitute a deterrent to an enemy bent on general war or provide the capability to carry a war of conventional means to the enemy's homeland. The only effective threat to Russia would be SAC's strategic nuclear capability, and as long as the hope of avoiding nuclear war remained viable SAC could not be used. Assuming Russia's objective to be defeat of the United States by conventional warfare, the United States in this situation would have to face the prospect of battle on American soil if she chose not to resort to strategic atomics.

The presence of enemy forces in small or large numbers would upset plans for deployment of active Army and tactical air force elements for reinforcement of America's allies, and might make it impracticable for some time for the United States to send troops out of the country for any reason. Once the possibility of enemy landings had been demonstrated, a much greater proportion of reserve strength than is now contemplated would have to be retained as a home defense force, in response to public demands...

News of an invasion of America would cheer and draw together the Russian people, just as the Dieppe raid, for all its cost and small results, encouraged the allies of England in 1942. Conversely, some non-Communist nations certainly would be frightened into at least temporary neutralism by so audacious a Russian move.

These considerations would afford Russia good grounds for undertaking a land invasion by conventional means against the United States during the early stages of a nonnuclear war.

Third Condition

In the third setting, after an initial phase of nuclear warfare, a substantial land invasion of the United States would offer outline portur scale.

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offer Russia advantages similar to those outlined previously and, in addition, opportunities for exploitation on a broader scale.

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If war began with an exchange of nuclear blows, it does not follow that Armageddon would be the sequel. The bomb at Hiroshima gave a beaten nation the excuse to quit. A great nation still fresh and hopeful can withstand great damage and fight back. However, nuclear war on the home bases of the combatants could not continue to the exhaustion of the atomic arsenals without complete destruction of the combatants. Therefore, if neither side surrendered in the initial phases-and it should not be expected that either Russia or the United States would give up easily -another type war would have to be fought.

There is a strong possibility that after the first exchange of nuclear attacks both sides would reevaluate the situation in an effort to discover some alternative to mutual murder. With proper mangement on both sides, the war could be held to a nuclear stalemate while a war of conventional means proceeded. In this second phase it would be the problem of both combatants to find means for coming to grips with the enemy.

The nuclear stalemate stage would be reached quickly in a matter of days or, at most, weeks. The mobilization structure would not yet have had time to raise large, trained, conventional forces, and the US would not be prepared to match Russian armies, either offensively or defensively. The United States certainly would employ tactical atomics to attempt to redress the numerical imbalance with Russian forces. However, since Russia would have a comparable atomic capability, the balance of strength in the long run would rest with the side which could support the larger armies in the field. Even in the employment of tactical atomics, Russia would have an advantage on American soil, where defensive use of atomics would not only damage Russian formations but destroy American property.

Russia might be unable to plan on sustained support of an oversea campaign employing forces large enough to overcome United States continental defenses. However, such forces probably could be landed in the Western Hemisphere and supported for a limited period. If Russia is serious in her sometimes expressed opinion that America is soft, she also might believe that Americans would not wish to continue a war fought in their own country and would capitulate before logistic support of the invading Russian armies collapsed. Under these conditions a land invasion of the US might appear to offer Russia an opportunity to bring the war to a quick conclusion.

Invasion Methods

While a ground assault could be accomplished in several ways, Russia probably would use submarines to deliver combat forces to their landing beaches. This method offers the advantage of maximum concealment of the approach maneuver. Supporting naval and air forces would not be required, and, by delaying warning of its arrival until it was ready to land, the assault force would retain the advantage of relative freedom of operation during the initial reaction period of defense activities.

Submarines designed to embark even small combat vehicles do not yet exist, as far as is known. However, construction of such ships is possible if tactical considerations justified their development. Submarines of suitable size now are under construction. Although the average United States fleet submarine has a displacement of about 1,700 tons and the *Triton*, which will be the world's largest fighting submarine, displaces about 5,450 tons, a submarine tanker with a cargo capacity of 30,000 tons now is being built in Japan.

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It will be 540 feet long and 69 feet wide, and nuclear powered with a submerged cruising speed of 22 knots. A similar hull, designed for general cargo, could carry the equivalent of several Liberty shiploads, and two or three such ships could deliver a Soviet combat force of fair size to the coast of the United States. The landing of combat vehicles and other impedimenta from large cargo submarines onto a beach would present difficult but not insurmountable technical problems.

In any ground attack of smaller scale than all-out invasion by land armies, the difficulties in the way of withdrawing the combat force would leave the enemy no practical choice but to consider the force expendable. To an imaginative and aggressive enemy this would be an advantage. Enemy operations planners would be freed from the need to conserve strength for conduct of an orderly withdrawal. They would gain a freedom of maneuver which would allow them to retain the capability for a tactical surprise after the initial phase of operations; and they would be free to exploit the destructive capabilities of the raiding force to the utmost.

In a raid or reconnaissance in force, there would be no need to plan for resupply of the landing party. Its expected operational life would be brief and it could forage for fuel and food as necessary. The limited cargo space on the submarine carriers, after the combat teams with their equipment and basic loads were embarked, would be used for ammunition and demolitions materials to replace initial expenditures in the vicinity of the landing beaches.

A landing could be made at one of many places along the coast of the United States, following an approach from either the Atlantic or Pacific. The landing point should be near a population center, large enough to offer good opportunities for damage but not too large for the landing force to control. In the vicinity of the town

or small city selected for the first phase objective, there should be opportunities for further objectives capable of being exploited rapidly. Charleston, South Carolina, for example, possesses such characteristics. Charleston is a city of approximately 70,000 with a complex of secondary objectives existing in the area. During the opening stages of a general war in which strategic nuclear weapons had not yet been used, an enemy ground force raid on Charleston might be conducted as follows.

The Raid

Just after dark of a winter evening, submarines carrying the assault force surfaced a few miles offshore and the amphibious personnel carriers slipped over the minefields toward the beach. Before the first troops reached the sand, a flight of helicopters carrying demolition squads lifted off the decks of the submarines and a few minutes later settled swiftly beside the several power stations in the area. Although there was some resistance by home guards, Charleston was plunged into darkness while the first wave of the landing force was moving onto the shoreline.

After dropping the demolition teams, the helicopters returned immediately to the submarines where they loaded additional demolitions materials and topped off their gas tanks. Then, touching down again at the power stations to pick up the demolitions men, the helicopters flew swiftly through the night northwestward toward Columbia and Lake Murray. There the destruction crews were to make an effort to break the great earth fill dam and pour a flood into Columbia. They placed their hopes on a portable atomic demolition set which had worked admirably on the test grounds but had not yet been tried in action.

Meanwhile, helicopterborne parties were knocking out all broadcasting stations before they could get back on the air with auxiliary power. The leading assault company headed for the telephone central. Automobiles moving with blackout lights (this much civil defense discipline was established in the late days of the prewar tension) were fired on ruthlessly by the

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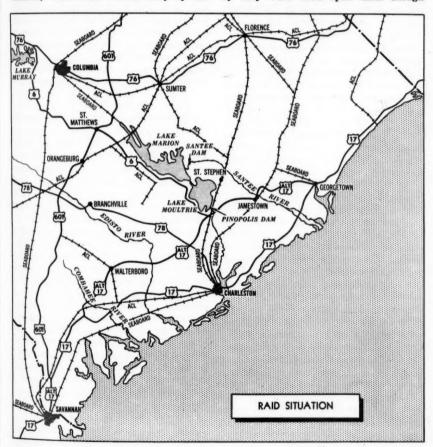
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the city, the helicopter teams which had silenced the radio and television stations were now picketing the roads outside the city limits. As escaping automobiles sped by they were fired upon until enough



armored reconnaissance vehicles. The police force made a gallant but futile effort to fight armored cars with Police Specials and Tommyguns, but were swept aside. Only a few outside telephone calls were completed before the switchboards were destroyed. To complete the isolation of

wrecks were scattered over the roads to prevent vehicle movement for the rest of the night.

Installations Destroyed

The carrier submarines now were providing fire support to the assault forces.

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Immediately after the power stations were blown, the Navy Yard was taken under missile attack. The first salvo damaged three large vessels, sank a small one, and set several fires raging. The yard was busy with its own problems and for the moment was in no position to assist the helpless city.

With the last of their missiles the landing fleet attacked the commercial piers. This attack did more damage by the fires which it set than by direct destruction of shipping, but the havoc was extensive.

By midnight the first of the two battalion combat teams (BCT's) was completely ashore and moving rapidly northward. The leading company wrecked the hydroplant and the spillway gates of Santee Dam, then continued on Route 6 to Santee, cutting the bridge across Lake Marion. Fighter aircraft caught the column in early daylight on the highway just west of St. Matthews and the remnant of the company turned back and headed up Route 601. At the junction of Route 76, the first platoon was halted by a roadblock established by a rifle platoon flown out from Camp Gordon by helicopter and, before the obstacle could be broken through or outflanked, a SKYCAV unit arrived and destroyed the enemy light armored vehicles.

The main body of the first BCT meanwhile had broken Pinopolis Dam and spread up several roads toward the Santee River. Whatever could be destroyed without delaying the advance materially was blown up or put to the torch. While there were no atrocities as such in the treatment of civilians, the raiders shot at anyone who crossed their sights. US air reconnaissance located the several elements of the main body in the morning by following the trails of destruction northward from the wrecked Atlantic Coast Line (ACL) and Seaboard railway bridges over the Santee. A platoon which had been detached to cut the coastal road was sighted by fighter aircraft south of Georgetown and, when it tried to get off the road, bogged down in the swamp. There its armored vehicles were sitting targets for the fighters' air-to-ground rockets. The balance of the first BCT, cutting the highway bridges above St. Stephen and Jamestown behind them, continued toward Sumter and Florence. As soon as the enemy lines of advance had been determined, paratroop units moved out of Fort Bragg to meet and destroy the raiding parties.

Raiders Defeated

The second enemy BCT landed shortly after midnight. Pausing only to destroy the bridges in South Charleston, the combat team moved south on Route 17 and Alternate 17, and by dawn had crossed the Edisto and Combahee Rivers. Helicopters patrolling to the north and west sighted an entrucked infantry battalion heading from Camp Gordon on Route 78 toward Charleston. One company of the second enemy BCT was detached at Walterboro and turned right to intercept the defense force, while the rest of the combat team drove on toward Savannah. The detached company surprised the defensive battalion at Branchville and inflicted severe losses. The battalion took up positions along the highway, and the enemy at once disengaged and disappeared northward. The battalion commandeered civilian vehicles to replace its damaged trucks and pursued the raiders, calling for air support to hold the intruders south of Orangeburg until the ground elements could arrive.

South Carolina was declared under martial law and militia formations were organized hurriedly in neighboring states, while the Pentagon frantically tried to guess whether the landing was the forerunner of a serious invasion or merely a raid.

By evening, 24 hours after the carrier submarines had surfaced off Charleston harbor, the enemy formations had been broken into fragments which would be cleaned up by ground forces and tactical air support in the next day or so. In that 24 hours, however, Charleston had been damaged extensively; Columbia had been devastated by flood waters released from Lake Murray; several hundred million dollars worth of property had been destroved and fires still were burning on the docks at Charleston and elsewhere: more than a thousand civilians had died: and main line rail traffic on the east coast had been interrupted at a cost not yet determined. The United States had suffered a severe prestige blow at a critical hour.

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Defense Measures

Defense of the United States against ground attack is an Army function. However, regular combat units cannot provide area security on a continental basis. There simply are not enough men to be in all places at the same time. During the time required to move combat units to points under attack the enemy is able to proceed with exploitation of his landing. Since destruction of property would be a probable objective of an enemy venture in the United States, failure to provide effective opposition in the early stages of the landing would forfeit this objective to the enemy. The visionary affair at Charleston illustrates the results of failing to oppose an aggressive and fast-moving attack until the regular combat forces can respond to the emergency.

Furthermore, if several enemy landings were made at widely scattered locations and elements of major combat forces were dispatched to deal with the individual assaults, the total defensive capability would be dissipated rapidly; indeed, the total defense force might be committed piecemeal before the main enemy attack was launched. In a serious invasion, as contrasted with propaganda and nuisance raids, a series of preliminary feints with

just this end in view would be a logical enemy maneuver. Therefore, since the primary objective of major combat elements in the defense of American territory is the destruction of the enemy fighting capability, these combat units should be reserved for careful commitment against main enemy strengths.

However, the American people have a right to expect protection from enemy attack. They cannot be expected to endure destruction and death philosophically while the armed services evaluate the enemy's capabilities and determine his intentions.

Employment of Noncombat Units

It becomes evident that a first line of resistance which does not utilize regular combat forces is necessary. The purpose of the first line of resistance should be to limit the radius of the enemy's zone of destruction, upset his timetable, delay his breakout from the landing area, and inhibit his movements after breakout.

Minor forces satisfactory for this task can be composed from noncombat type units-training, service, and headquarters troops of the several armed services. These units now are generally considered not combat effective, and have not been given fighting missions in continental defense plans. Yet such units can perform useful combat functions in local defense operations. They are composed of individuals under military discipline, individuals who, for the most part, are in service rather than line units by accident of circumstances, not by reason of any deficiency in basic abilities. Among them are a proportion of men and officers with combat experience who can constitute the nucleus of fighting units. The defensive roles of noncombat type units necessarily must be limited, since their daily jobs prevent their undertaking a full-scale combat training program, and since it would be impracticable to furnish them with any considerable amount of combat matériel. Individual weapons and equipment and a few crewserved weapons are all that could reasonably be provided to these units. However, this would be sufficient to give them a measurable fighting capability.

Given the job to do, most service, training, and headquarters units within the Continental United States could be prepared for local defense roles with little difficulty. As a first step, every officer and man not assigned to a combat unit should be given a refresher course in basic infantry tactics and techniques, together with a smattering of combat engineer work. Thereafter, provisional combat organizations should be developed, specific local readiness missions assigned, and sufficient training accomplished to prepare each organization to take up local defense tasks immediately when required.

Militia Forces

It is not enough, however, to depend upon the military services to protect the American people in time of invasion. At best, Federal-controlled forces will be spread thin. Therefore, the states and municipalities must improve their own capabilities to meet enemy forces within their borders. Effective local forces must be ready to conduct field operations from the beginning of enemy attack.

Whether an enemy ground attack occurs before or after a declaration of war, National Guard units will either have been called to the active Federal service or will be programmed for recall under mobilization plans. To meet their own needs, the states should form militia organizations, using for the backbone of such organizations those veterans who have discharged their active military service obligations and who are not members of the Organized Reserve or National Guard. Retired officers of the armed services might be utilized to command these vilitia forces.

he militia does not need training for d field duty, but should be trained in protection of industrial facilities, in guerrilla methods of hampering movements, in intelligence collection, and in riot control. Militia forces should know how to establish unmanned roadblocks, destroy small and easily reparable bridges, dynamite culverts, and should be able to repair damage from minor demolitions. Professional military advisors should be provided to assist the militia to select important local facilities which are subject to relatively easy destruction, to select defensive positions, to outline defensive tactics, and to help design training exercises. The chief purpose of the militia units should be to protect targets in the vicinity of the members' homes until regular forces can come to their assistance.

The provisional defense elements, made up of noncombat type units and the militia, although prepared to take independent action against a local enemy ground attack, should pass to Army combat command as soon as possible after engaging the enemy.

The British Home Guard of World War II offers a pattern for formation of an American militia. Provided with individual weapons and relatively few outmoded field pieces, the British Home Guard was prepared to give Hitler's expected amphibious forces a stirring reception. Winston Churchill's ringing promise will be remembered:

We shall fight on the beaches, we shall fight on the landing grounds, we shall fight in the fields and in the streets, we shall fight in the hills; we shall never surrender. . . .

The American people, forewarned and armed, can do as much for their homeland.

A local defensive capability which could meet enemy invasion efforts promptly, quarantine attacked areas, and disrupt the enemy's timetable would increase continental defense capabilities greatly by relieving major combat units of area security tasks and allowing them to be used prin emy

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Civil Defense

The existing civil defense structure provides the basic organization on which a broader defense program may be erected. The civil defense program should be expanded and measures necessary for passive defense of the civilian population against all possible variations of enemy attack should be included in the civil defense operating procedure. Only in this way can the possibilities of confusion during emergency be eliminated. For example, some means for distinguishing between various types of emergencies are needed. Present civil defense measures call for evacuation of metropolitan areas when air attack is threatened. However, this procedure would be against public interest in the case of ground attack, at least until the attack showed itself to be a major effort. Therefore, specific operating procedures and distinguishing signals are required for air attack, ground attack, and other disasters which require concerted action by the entire population of a community. The civil defense organization should have the primary responsibility for solving this problem and for conducting the general program of educating the public for its duties in case of enemy attack.

Conclusion

Passive defense is necessary but unexciting. The man in the street will want to participate actively in the defense of his home. The average citizen can serve the general defense best by using his eyes and ears intelligently. Nothing else that the public can do in the face of enemy ground attack will be as valuable as the collection and prompt transmission to the Armed Forces of dependable information on enemy strengths and movements. All the territory through which the enemy may pass will be covered by civilian observers who, if they are properly instructed and organized, can furnish the defense forces a complete, up-to-the-minute picture of enemy operations. Defense intelligence centers should be organized in each town and district to receive, consolidate, and forward screened reports to designated military agencies. Message authentication procedures should be developed and shortwave radio nets established on a standby basis. Instructions should be furnished in the use of panel signals for passing information to friendly aircraft. Civil defense organizations can make a direct and invaluable contribution to military defense operations by organizing intelligence centers and conducting training, with Army assistance, in collection and processing of information on enemy operations.

No one weapon, or one service, or one form of military action is considered sufficient to meet all our security needs.

Hence our program is geared to the maintenance of forces which could be used in a variety of situations whenever and wherever required. Our forces must stand ready to cope with limited wars waged by Communist satellites or a world war III, if one should be forced upon us.

KEEPING PACE WITH THE FUTURE--

Resident Instruction at USA CGSC

Colonel James L. Frink, Jr., Artillery
Faculty, U. S. Army Command and General Staff College

The Army needs men who bear the stamp of approval of Leavenworth—a stamp, hallmark which is known and respected throughout the military world as indicating one who is soundly grounded in the essentials of his profession, a man of character capable of advising wisely and leading courageously.

-General Maxwell D. Taylor Chief of Staff, U. S. Army arm

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This is the fifth in a series of articles expanding various aspects of "USA Command and General Staff College Keeps Pace With the Future," written by Major General Lionel C. McGarr, USA, Commandant of the College, and published in the April 1957 issue of the MILITARY REVIEW.—Editor.

THE performance of the United States Army in this crucial period of history depends upon the quality of its officer corps. The United States Army Command and General Staff College plays a key role in developing the professional competence and dynamic leadership required by the responsibilities of military command. It must enable Army officers not only to maintain the high standards of yesterday but to progress and improve so as to respond successfully to the challenges of the atomic-missile era.

USA CGSC makes its major contributions to the professional education of the Army Officer Corps through resident instruction, nonresident instruction, and the development of doctrine. Previous articles in this series, "Keeping Pace With the Future." discussed nonresident instruction and the development of doctrine. This article describes resident instruction. Figure 1 shows the place of the resident instruction mission within the over-all College mission. Both resident and nonresident courses of instruction incorporate the latest doctrine, present and future, developed as described in an article 1 by Colonels Hobson and Kinney. As was stated in a previous article,2 nonresident courses of instruction are based upon the resident courses. Thus the components of the United States Army Command and General Staff College mission are thoroughly integrated to form a compatible whole in the College organization.

Leavenworth is the home of the Army's senior tactical school and located here is its only academic institution devoted specifically to the operations of the combined

² Military Review, USA CGSC, Volume XXXVII, August 1957.

The U.S. Army Command and General Staff College plays a key role in developing professional competence and dynamic leadership required by the responsibilities of military command in the atomic-missile era

¹ Military Review, USA CGSC, Volume XXXVII,
November 1957.

arms and services. Each year approximately 3,000 of the active army and the Reserve and National Guard components participate in the resident program.

The resident courses of instruction at the College are shown in Figure 2. The Nuclear Weapons Employment Courses and the Senior Officer Nuclear Weapons Employment Courses were described in "Keeping Pace With the Future—Train-

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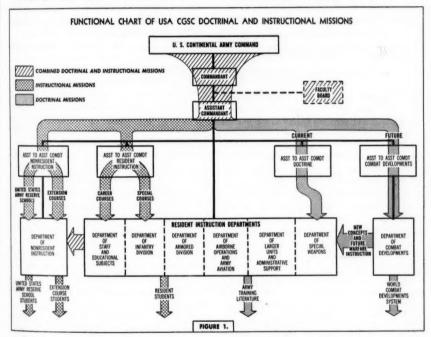
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The purpose of the Regular Course is:

To prepare officers for duty as commanders and general staff officers at division, corps, and field army including their logistical systems, the communications zone and its subordinate elements, and the theater army personnel replacement system.

This involves: the ability of USA CGSC students to perform these func-



ing Officers to Fight on Atomic Battle-fields" printed in the October 1957 issue of the *Military Review*. The refresher courses are conducted yearly for the staffs of combat divisions and logistical commands of the Reserve components.

An important part of College instructional effort is devoted to the preparation and conduct of the Regular and Associate Courses, with their annual combined output of more than 1,200 officers. tions, as appropriate to their ranks, immediately upon graduation in peace or war; their ability, based upon USA CGSC education, to improve and progress over the years after graduation to perform these functions at the highest ranks in peace or war; their ability to adjust to likely conditions of future war; and as an implied responsibility, their ability satisfactorily to perform in a wide variety of world-

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wide field grade staff positions at nontactical headquarters immediately upon graduation, in accordance with established Department of the Army manning requirements.

The purpose of the Associate Course is:

To qualify officers for duty with the general staff of combat divisions or logistical commands, and to familiarize them with the duties of the general staff at corps and army or communications zone level.

The Associate Course is based upon the Regular Course; within the scope of its mission most of its instruction is identical to subjects presented in the Regular Course. Associate Course students take a 12-week "common phase" after which the class is divided into two groups, one orienting on logistics and the other orienting on combat division operations for the remainder of the 16-week course. This division of the Associate Course into a combat group and a logistical group for the last four weeks of the course permits the officers in each group to receive more instruction in their specialty (either operations or administration) within the over-all time available for the course. Logistical phase students receive the full amount of logistical instruction provided in the Regular Course.

These two resident courses, Regular and

Colonel James L. Frink, Jr., was grad-uated from the United States Military Academy in 1935; the Advanced Course of The Artillery School, 1940; the 27th General Staff Class, USA CGSC, 1946; and the U. S. Army War College, 1954. During World War II he commanded the 332d Field Artillery Battalion, 86th Infantry Division. Other assignments include duty on the faculty of USA CGSC in 1948-50; G1 of I Corps and executive officer, 25th Division Artillery, Korea, 1950-51: Office, Deputy Chief of Staff for Personnel, 1952-53; and G1 and Chief of Staff, USARCARIB. In 1957 he was assigned to the faculty of USA CGSC, where he is Assistant to the Assistant Commandant for Resident Instruction.

Associate, are necessary to provide, within the means available to USA CGSC and the Army, an adequate number of officers for duty at the various echelons of command and staff (about 50 percent of the active duty officers of the Army attend one or the other of these courses). The additional length of the Regular Course permits more instruction in complex situations, future warfare, and educational subjects. Other differences between the two courses are obvious from a comparison of their purposes.

The Management of Resident Instruction

In his article, "USA Command and General Staff College Keeps Pace With the Future," Major General Lionel C. McGar, Commandant of the U. S. Army Command and General Staff College, pointed out that the planning and writing for the /8 (1957-58) curriculum was guided by the following "Instructional Purpose":

Instruction is designed to develop student ability to recognize problems, determine the basic issues involved, and know where to obtain the necessary information for problem solutions. Memory work is held to an absolute minimum. Specifically, the student must be able to understand and properly apply principles, analyze problems based on pertinent principles and facts, arrive at sound logical solutions or decisions with reasonable speed, and communicate his reasoning and decisions with facility, both orally and in writing. Instruction is oriented primarily on developing logical and original reasoning ability in the student, rather than on the merits of any single skill or solution. Particular attention is given to the long-term development of the student in military problem solving, self-expression, working as a member of a team, and character development.

Two of the major aspects of this philos-

First, instruction aims at maturing cer
² Military Review, USA CGSC, Volume XXXVII.

April 1957.

tain basic qualities of the student, such as the ability to think, to reason, to solve military problems, and to utilize sound judgment. Inherent in this objective is the traditional Leavenworth goal of instilling in the student the facility for estimating a situation—analyzing the facts, determining the alternatives, evaluating the pros and cons, and making and communicating workable decisions. This approach

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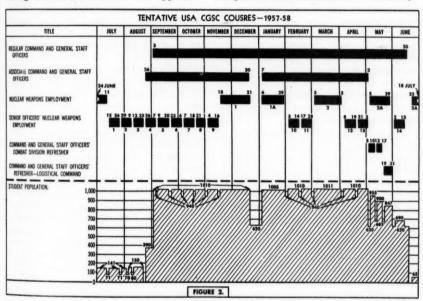
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day's graduate. The fundamental ability to think and to reason from facts through to the logic of sound conclusions is essential. Obviously, improvement is necessary—the requirements are in an ascending curve. Our standards must not only be established in relation to present and future requirements (not necessarily relative to yesterday's standards) but consider as well the professional standards of the enemy.



stimulates the development of character, moral courage, self-expression, and teamwork.

Second, instruction equips the graduate with up-to-date knowledge of ground combat operations, current and future, atomic and nonatomic. Subject content must be modern and forward-looking so that the graduate can carry out successfully his responsibilities in the Pentomic Army of today and tomorrow.

We live in a dynamic age where there are no templates for war. In the future, problems now unknown will confront to-

These are objectives which resident instruction must attain.

Attainment of these objectives in a changing Army calls for sound management of resident instruction. The management system must keep instruction live, vital, and modern, and ensure curriculum flexibility within an academic year and from year to year. It must also continue the traditionally high quality of Leavenworth instruction, maintaining essential control over content and method.

Figure 3 shows the College organization, highlighting that part which is primarily concerned with the management of resident instruction.

The USA CGSC Educational Advisor (a professional civilian educator) plays a very important role in advising the Assistant Commandant, the Commandant, and the Faculty on all educational aspects of resident instruction to include the planning and preparation of the curriculum, and the instructional methods employed in presenting the subject matter to the resident classes. He acts in an advisory capacity to the Faculty Board and is a member of the Curriculum Planning Board. He conducts an Instructor Training Course for new faculty members as well as annual in-service workshops for author/instructors. Additionally, he provides professional counsel for the student evaluation program.

The Army's conversion to the new pentomic divisions, US CONARC's directives to consider the atomic environment as normal, and the Chief of Staff's enunciation of the likely roles and environments of the Army required that the curriculum be completely revised and rewritten to produce courses of instruction which are in keeping with the times, both present and future. The College recognized these and other problems and advantageously grasped the opportunity afforded by this major rewrite to adjust the educational philosophy to the requirements of the times and to make other significant improvements. The challenging role of the missile in present and future warfare is recognized and realistically portrayed throughout instruction as appropriate. Increased emphasis is placed on the broad treatment of unconventional warfare, rather than in the narrow context of its definition-Chemical, Biological, Radiological (CBR) warfare attains increased stature.

To accomplish this major curriculum rewriting task for the 1957-58 College year, the College organized along functional lines, including a change from a

director staff to a coordinating staff. This organization provides for centralization of like functions under a single department head. For example, instruction and doctrinal development pertaining to the infantry division is the responsibility of one department—the Infantry Division Department. It provides greater flexibility for action and freedom of thought and ideas in an organization which deals in ideas (concepts and doctrine). It also reduces the reaction time from the inception of new ideas or changes to their incorporation in College instruction, as appropriate. Actually, this present functional organization results from arranging the new (1957-58) curriculum into optimum "blocks" of instruction (courses of study) and then providing a departmental organization to support them.

The change to the coordinating type staff eliminates one echelon of command, reduces the size of the academic staff, and permits a corresponding increase in strength of the departments. This desirably places the Assistant Commandant and the Commandant closer to the "operating" level of the College. The staff needed is one to assist the Assistant Commandant and the Commandant in planning coordination, and supervising execution. All of these functions now are accomplished by a coordinating staff.

The organization for management of resident instruction is built upon the concepts of minimum necessary centralized planning and direction of essential matters and major decentralization of planning and execution by departments within broad College level policies.

As indicated above, policy direction and command decisions on matters of major significance are provided by the Commandant and the Assistant Commandant. Implementation and followthrough on these major College level decisions are provided by the College's coordinating staff—principally the Assistant to the Assistant

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Commandant for Resident Instruction (AACRI) as they affect the various courses of instruction conducted at the College. Departmental responsibility for doctrine is under the staff supervision of the Assistant to the Assistant Commandant for Doctrine (AACDOC). Within guidelines prepared by the staff and approved by the Assistant Commandant and the Commandant, and under the supervision of the staff. departments plan, prepare.

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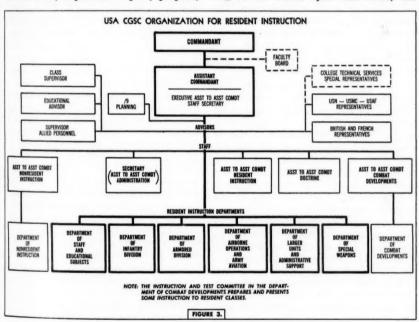
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mandant, prepares a draft of the Commandant's Annual Curriculum Guidance in September. A Curriculum Planning Board, representing all elements of the College (including AACRI) is appointed by the Commandant in this same month. This Board, working with the Commandant's Annual Curriculum Guidance, prepares a draft of the Commandant's initial Decisions on the succeeding academic year's curriculum. Based upon this draft, the



review, and present complete and cohesive courses of study.

Another new feature of the College is the approach to annual Curriculum Planning. In a permanently established table of distribution position, the future planning officer in the office of the Assistant Commandant devotes a major portion of his time to Curriculum Planning on a year-around basis. The future planning officer, under the guidance of the Assistant Com-

Commandant finalizes and issues his initial Decisions which include an allotment of instructional hours to each departmental course of study. AACRI, in coordination with other members of the coordinating staff, then develops the College Guidelines for the departments covering the succeeding academic year, based upon the Commandant's initial Decisions. The Commandant approves these College Guidelines before they are issued. Thus in

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the over-all sense, the Commandant ensures curriculum balance and appropriate subject area emphasis. AACRI assembles the programs of instruction; provides staff supervision of planning, preparation, and conduct of instruction by departments: analyzes and evaluates the curriculum when finally prepared; and provides a major part of the coordinating staff supervision of the student evaluation program. The Educational Advisor is a major participant in these activities. AACRI's responsibility, in coordination with other staff sections, includes the entire range from educational philosophy, through curriculum design and methods of instruction, to classroom organization and procedure.

Although the AACRI has major staff responsibility for resident instruction, he and his staff operate closely with the staff of the Assistants to the Assistant Commandant for Doctrine (AACDOC) and for Combat Developments (AACCD) who are responsible for staff supervision of the doctrinal basis (present and future) for resident instruction. Their staff teamwork reflects the close relationship between two distinct responsibilities of the Collegedoctrine and instruction. Operating as a team under the Assistant Commandant, the activities of AACRI, AACDOC, and AACCD are as closely coordinated as are the activities of the G2 and the G3 on a tactical staff. To further aid the Assistant Commandant in this team effort there is the Executive Assistant to the Assistant Commandant, a senior officer. He is a "Chief of Staff." with principal functions of coordinating all staff activities, and acts for the Assistant Commandant, within established College policy, on all activities of the College.

The functional organization of the academic departments simplifies the logical assignment of responsibility and authority for doctrine and instruction within clear-cut subject areas, and fully supports the "courses of study" which make

up the curriculum. The title of each department indicates its general area of responsibility and authority. For example, all nonapplicatory staff instruction is presented by the Department of Staff and Educational Subjects. Since the department is also responsible for staff doctrine, this arrangement facilitates instruction which is modern, integrated, and without duplication or gaps, and capitalizes on the collective ideas and knowledge of the entire department.

The College has adopted a recommendation of the Educational Survey Commission, contained in its report of June 1956, that the review procedure for individual units of instruction (Subjects) be simplified by allowing departments to bear a greater responsibility. Each department is responsible for and conducts its own review of instructional units. The composition of the department review board varies with each Subject reviewed in order to provide the best qualified department offcers in the particular subject area (defense, offense, retrograde, etc.) covered. Since many Subjects include some applied instructional material for which other departments have primary responsibility, representatives from such departments, where pertinent, are asked to sit on the review board as advisors; similarly, members of the staff may and do sit on review boards as advisors. The department head is always chairman of his department's review board. College level control of these department reviews is maintained primarily through Faculty Board review of the doctrinal basis for instruction, through the AACRI, Assistant Commandant, and Commandant reviews of examinations, and normal staff supervision.

Coordination

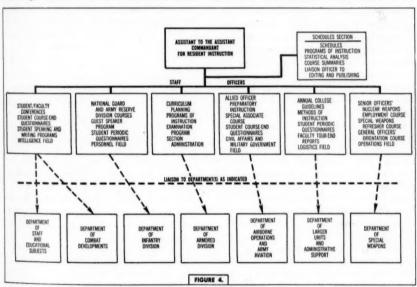
Obviously, coordination is vital to success. For resident instruction, this is accomplished in three ways.

⁴ Military Review, USA CGSC, Volume XXXVII. April 1957.

First, as previously brought out, great stress is placed on interdepartmental coordination. Fundamental responsibility is assigned to only one department; applicatory responsibility is usually assigned to several departments. Departments prepare approved concept papers in appropriate areas of their "fundamental" sphere of interest to assist in guiding departments with "applicatory" responsibility. Departments having applicatory responsibility for a particular instructional area work

the responsibility and authority in a particular functional field. For the same reasons, less coordination is required by the staff, which in turn permits a smaller staff.

The second major means of coordination is accomplished through the actions of the AACRI staff section. Figure 4 shows the interior organization of the AACRI staff section and the principal functions assigned to each section staff officer. A key mission of each officer is his liaison with a



closely with the department having fundamental responsibility for that area, coordinating applied instruction to ensure consistency with basic doctrine. Conversely, each department which has responsibility for fundamental instruction plays the role of advisor to other departments in its special sphere and assists the staff in monitoring the application of such instruction in all departments. Obviously, the functional organization of departments results in simpler and more effective coordination since each department has

specific department. It will be noted that one AACRI staff officer has liaison responsibility to two departments, one of which is the Department of Combat Developments; liaison is specifically with the Instruction and Test Committee of the latter department, since AACRI has staff supervision responsibility for the future warfare instruction prepared and presented by this committee. Such a liaison mission is twofold; first, to ensure that "his" department understands and implements College policies and guidelines, and second,

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to ensure that the problems of his department are fully understood and resolved at the staff level. He works closely with all echelons of his department; sits on department reviews as appropriate; is familiar with every unit of instruction taught by the department; sits in on the department's classroom instruction; and reviews their subject directives and outline plans.

While the individual AACRI staff officers have liaison responsibility to a specific department(s), some of them have secondary over-all AACRI staff responsibility for matters which cut across all departments, such as the examination program and methods of instruction. This across-the-board responsibility is a decided advantage of the present coordinating staff organization, as opposed to an "academic staff" which treated only with G1, G2, G3, G4, and G5 instruction and possibly minimized the across-the-board matters. Additionally, the placing of fundamental staff instruction and doctrine in one staff department and organizing this by "G's" (within the Staff Section of the Department of Staff and Educational Subjects) has decentralized and reduced some of the need for College level coordination of staff instruction.

These AACRI staff officers assist in interdepartmental coordination on matters pertaining to resident instruction by daily contact with AACRI section liaison officers to other departments; by participating in staff development of College Guidelines; and by their assignment of over-all AACRI staff responsibility for instructional areas which cut across all departments as described above. Special AACRI attention is given to staff, logistics, intelligence, and balanced coverage of nuclear weapons.

Finally, coordination is achieved through a Faculty Board which is composed of all department heads and the chief of each coordinating staff section under the chairmanship of the Assistant Commandant. This Board reviews such areas of major importance as the doctrinal basis of instruction and College Directives. College Directives are prepared by each instructional department for each course of study it presents as a part of the various resident instructional courses. They result from the breakout by departments of the over-all hours of instruction assigned to them by the Commandant's Decision on the Curriculum, into titles, scopes, and hours for each proposed unit of instruction. The Board does not review individual departmental units of instruction; this is a specific responsibility of each department, as previously explained.

Curriculum Planning

The management of resident instruction is best observed by following the Curriculum Planning cycle as it is being accomplished for the (1958-59) /9 courses of instruction. Figure 5 illustrates the planning cycle for the Regular and Associate Courses.

First, the future planning officer in the office of the Assistant Commandant prepared a draft of the Commandant's Estimate of the Situation and Guidance to the /9 Curriculum Planning Board (CPB), which the Commandant finalized and issued in September 1957. At this time, the Commandant appointed the /9 Curriculum Planning Board, composed of representatives of all major elements of the College (a Curriculum Planning Board is necessary since at this stage of planning the task is broader in some respects than are AACRI's responsibilities). The Board, operating within the limits of the Commandants /9 Guidance to the Curriculum Planning Board, prepared a draft of the Commandant's /9 Planning Decisions. The Board considered all aspects of the instructional program for the 1958-59 academic year, including the related requirements of the College doctrinal effort, the administrative problems of a projected move to the new academic building during the summer of 1958, the possibility of increased enrollment in the 1958-59 academic year, the personnel adjustments in College organization made necessary by change in workload, as well as the more detailed consideration and assignment of responsibilities among departments.

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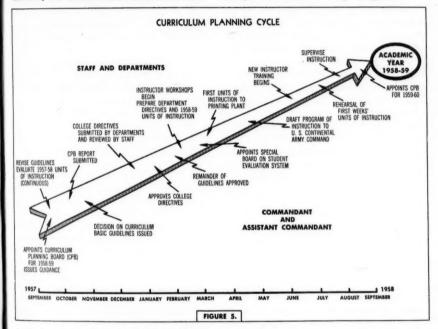
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In November 1957, based upon the Curriculum Planning Board's recommendations, the Commandant issued his finalstaff sections (primarily AACRI and AACDOC) develop the planning Guidance and Decisions, and prepare a draft of the /9 College Guidelines, which, when approved, becomes Faculty Memorandum Number 1, 1958 (1958-59 academic year). These College Guidelines, submitted by phases of preparation to the Commandant between December 1957 and February 1958, are in the following categories:



ized /9 Curriculum Guidance and Decisions on the /9 Curriculum. Among many other things, as previously stated, this document specified the over-all allocation of hours to each departmental courses of study. This must be done on an over-all basis from an Assistant Commandant/-Commandant point of view and not based on a piecemeal or special interest view-point, in order to assure the best possible sampling of subject matter and balance in the curriculum. At this point the several

Type I—Instruction and guidance for the preparation by departments of draft College Directives and any other part of the guidelines prepared by December 1957.

Type II—Instructions and guidance for the departments for writing of units of instruction and any other part of the guidelines not included in Type I prepared by January 1958.

Type III—Guidelines not included in Types I and II and prepared later (February-March 1958). The Commandant approves College Directives at or after a Faculty Board briefing at which department heads brief each other and the Assistant Commandant and Commandant on their proposed breakout of Subjects for their courses of study. This takes place in early February and writing of units of instruction can then begin.

Preparation of the Draft POI (Program of Instruction) for each course follows Commandant approval of the College Directives. The final POI for each course is then prepared following US CONARC review and approval, usually between May and July.

During this planning period the doctrinal basis for instruction is being drafted in all departments. In the /9 (1958-59) course, part of the doctrinal basis for instruction will be College prepared texts, in lieu of special texts, to supplement the field manuals now in existence and to facilitate training literature revision. These supplemental texts will contain much of the reading material formerly contained in subject advance sheets and other supplemental issues.

The time from February through the summer will be occupied in preparing units of instruction for presentation in 1958-59. In the average year about onethird of all units of instruction are involved in a major rewrite to include a change in geographical location, a basic change in design, or the preparation of a completely new unit of instruction. The remainder of the curriculum is revised as necessary to reflect experience, latest doctrine, and to obtain product improvement. This average will be true for /9, since this will be a year of refinement of the improvements made in /8 and not a year of complete change.

During this period, also, instructor workshops and new instructor training programs are carried out, further evaluation of the current curriculum is obtained, and additional detailed curriculum planning is accomplished.

Instructor workshops are an instructorclinic type activity conducted by the Educational Advisor, in coordination with AACRI, beginning about 1 February and continuing during the spring. These workshops are conducted on a part-day basis and are about a week in length. They run consecutively until all author-instructors have attended. Each author-instructor attends prior to writing /9 units of instruction. The purpose of these workshops is to:

- Provide annual training for "on-thejob" improvement of author-instructors.
- Pool author-instructor experience in methods and techniques of instruction for the benefit of both the staff and departments.
- 3. Thoroughly familiarize all authorinstructors with /9 College Guidelines.
- Provide practice teaching in discussion technique. New instructor training courses (ITC's) last about two weeks each and are conducted during the summer and early fall.

The AACRI concurrently ensures that all points of the Commandant's Guidant and Decisions within his sphere of responsibility are accomplished. For example, the AACRI ensures that G2 coverage throughout the entire course of instruction meets the requirement of the modern Army and is appropriately supported with forward-looking concepts.

By June approximately one-third of the course of instruction will be dispatched for printing. Printing is staggered in order to create minimum extra load on the Army Field Printing Plant and on the manufacture of training aids.

Finally, in August and September of 1958, Curriculum Planning will begin for the 1959-60 year (except for the future planning officer who plans on a yeararound basis); in September the Curriculum Planning Board for that year will

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again be established and the cycle will repeat.

Throughout the Curriculum Planning and writing cycle, and during course presentation, "curriculum flexibility" must be provided. This flexibility is essential to permit the latest concepts and doctrine, new organizational changes, additions directed by higher headquarters, and extra guest speakers to be integrated into a resident course at any time during its preparation or presentation. Flexibility results from retaining at College level a small number of academic "contingency" hours and by curriculum construction. Any contingency time not required for actual contingencies is reduced gradually during course presentation by increasing instruction in areas where more emphasis is desired, as approved by the Commandant.

The several courses of study in a curriculum are composed of Subjects. A Subject is composed of one or more three-hour lessons, each of which is an individual learning experience. The several "lessons" of a Subject are relatively independent of each other and thus need not be scheduled consecutively. Hence a new Subject (contingency) may be added, or an existing Subject can be expanded with relative ease. The normal classroom day is six hours, permitting two three-hour lessons per day each from two different courses of study. These three-hour lesson building blocks not only facilitate curriculum flexibility but provide classroom variety during the day, increase student interest, and contribute to greater learning.

In the construction of a curriculum, great care is exercised to prevent "over-crowding" of the Subjects and superficial treatment of the subject matter. It is far better to cover a "representative sample" in greater depth. The Commandant controls the "size" of each department's representative sample by his allocation of hours for each departmental course of study; he ensures the broad parameters

for a representative sample within each department's functional area by providing College level controls (College Guidelines) and by staff supervision. Each department in turn must further sample its functional area to produce its course of study. The several departmental courses of study are integrated, through AACRI scheduling, into a homogeneous and sequential "resident course of instruction."

In this manner appropriate course balance, emphasis, and content are provided.

Course content also provides for specific instruction and practice in both oral and written communication. The student is reminded that during every class recitation he must think about and practice clarity, preciseness, and saying exactly what he means. The evaluation program also supports and reinforces this objective.

Subjects normally are presented in 50man classrooms. Where appropriate to the subject matter, the "small group discussion" method of instruction is utilized (12 to 13 students form a discussion group). Initially, an instructor acts as the discussion leader for each group, to "demonstrate" as well as to put across the particular Subject. Subsequently, the student serves as a discussion leader. He is provided basic material to study beforehand and a "discussion leader's" guide or agenda to reduce his "extra" study time and to ensure that his discussion group isolates the major issues for discussion. This method of instruction, along with staff planning exercises, is a major vehicle in the College's effort to develop group leadership.

The strengthening of student character, integrity, and moral courage is also an important goal of the several courses of instruction and the small group discussion contributes materially toward this goal. Here the group leader guides the discussion of his contemporaries and group members. After thorough group discussion, each student must come to his own

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future yeararricur will individual decision on a course of action, where applicable. Throughout the course, emphasis is on individual student reasoning, judgment, and decision making. The evaluation system further supports this development of character and integrity in an atmosphere of trust and confidence between students and the faculty. Burdensome administrative restrictions are thus avoided.

Curriculum Evaluation

The true quality of the curriculum rests on effective stimulation of student thought processes. The design and preparation of the curriculum are only the beginning. Analyses and surveys are continued even after the course has begun to ensure that the graduate, the final product, will be "soundly grounded in the essentials of his profession . . . [and] capable of advising wisely and leading courageously." 5 As the course progresses it is under careful scrutiny to determine what progressive improvements can be introduced. It is the AACRI task to monitor this evaluation. to correlate the results, and to make or to recommend the changes indicated.

One method of evaluation is the review of printed material by the staff. A second method is by staff visits to the classroom.

A third method is a Subject Content Survey. This survey results in a comprehensive and detailed calculation of hours devoted to each instructional area. Obviously, the quality of instructional coverage cannot be measured in time alone; it is measured by the appropriate combination of subject-content, method of instruction, and time. This is fully recognized in utilizing the data resulting from the survey. However, instructional areas and the time devoted to each are the finite starting points.

A Subject Content Survey Form is completed by each author on each subject. This is then consolidated, analyzed, and evaluated by the staff. The main purpose of this survey is to ensure that all instructional areas receive adequate coverage and that true emphasis is placed on the area directed in the Commandant's Decision and subsequent College Guidelines—for example, logistics and missile instruction.

A fourth method consists of informal conferences with students. Periodically during the Regular and Associate Course, each department holds a conference on its portion of the curriculum with a small group of representative students. At these conferences, attended also by AACRI AACDOC, and the Educational Advisor, where possible, students are encouraged to table any ideas, suggestions, or problems they consider appropriate. These conferences are both stimulating and profitable.

A fifth method in the continuous curriculum evaluation conducted by the College is the use of questionnaires. These involve both student questionnaires and field questionnaires. The purpose of evaluation by students is to give them a sense of participation in improvement of the College and for them to actually contribute as appropriate. This system is designed to ensure that the College is exploiting every source and is considering and evaluating all ideas and processes whereby it can improve its graduates. Completed questionnaires are evaluated qualitatively, not "statistically." They are of use only to the College in its continuing search for self-improvement.

Objectives, curriculum design and construction, and organization all notwithstanding, the one true measure of how successfully the College accomplishes its resident instructional mission is the effectiveness of the graduate in the field. Therefore, in conjunction with the traditional self-evaluation program of USA CGSC, the Commandant dispatched on 5 November 1957 an open-end questionnaire concerning USA CGSC graduates to over

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⁵ General Maxwell D. Taylor.

80 senior officers within the Army at large. The sampling was set up to include senior commanders and staff officers from divisions to members of the joint staff in Washington. The replies to this questionnaire will be analyzed in the early spring of 1958 so that the information they contain can be exploited in the curricula for 1958-59.

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Summary

The management of resident instruction at the U. S. Army Command and General Staff College is a complex and challenging task. It can be handled efficiently only by precise planning to meet concrete objectives; and by centralized control of major areas with decentralized detailed planning and decentralized execution, leavened by a spirit of teamwork and cooperation toward a common goal. The academic year

1957-58 has brought about major changes and much progress. Still, the College recognizes that for 1958-59 it will have had the benefit of a year's experience with an allnew curriculum as well as the benefit of a year's experience by the other Army schools and by the field in employing the new ROCID, ROCAD, and ROTAD Divisions. Thus it expects to improve still further its courses and better qualify the graduate for his vital role in the Pentomic Army of today and tomorrow.

The goal is established and understood by all. Simply stated, it is to ensure the intellectual vitality and professionalism of the officer corps of the United States Army. Leavenworth is meeting this challenge with the full confidence that it will perform in the future in a manner worthy of the traditions of the past.

An army is engaged constantly in either training or fighting. In common with all who have had experience of war, professional soldiers hope that our country will never be called upon to fight again. But in any case, training never ends, and training is teaching. Every officer and man in the Army is a teacher or a pupil most of his service. The average officer spends more of his time as a trainer and a teacher than in any other capacity.

General Maxwell D. Taylor

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AROUND THE WORLD

UNITED STATES

Surveillance Drone

The SD-3 surveillance drone, produced for the Army Signal Corps, uses interchangeable nose units for rapid switch



US Army Photograph
Model of SD-3 surveillance drone

from one surveillance sensory device method to another. An all-weather system, the SD-3 is zero-length launched using jet assisted takeoff, and is recoverable.—Official release.

Distinguished 'Deltas'

The F-106A Delta Dart, developed from the operational F-102A Delta Dagger and claimed to be the fastest all-weather interceptor ever flown, is undergoing exhaustive flight tests. Notable differences be tween the two delta-wing aircraft an found in the vertical stabilizers, the engine air inlet ducts, and the optimum wasp waist of the F-106A fuselage. The vertical fin of the F-106A is sweptback and squared off at the tip, while the fin of the F-102A is delta-shaped. The air intaken



F-106A (left) and F-102A interceptors

ducts have been moved back to the leading edge of the wing in the F-106A to save weight and to control the flow of air into its more powerful J-75 engine. Internally, the two aircraft differ in powerplants and in an advanced armament system built into the F-106A. Both of the supersonic interceptors carry the Falcon guided missile.—Commercial source.

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Lightweight helicopters under study and development include the GA-400R Gizmo. in improved version of the Gyrocopter (MR. Oct 1956, p 68), and a portable sinple-blade back-pack VTOL aircraft. The GA-400R Gizmo is an extremely light,



Lightweight helicopter Gizmo

standard helicopter which uses an outboard marine engine as a powerplant. It can carry a useful load of 200 pounds at



B-8M Gyrocopter

speeds up to 55 knots. The Gizmo, which weighs only 490 pounds fully loaded, uses rubber belts for power transmission.

The B-8M Gyrocopter, while not a VTOL aircraft, can take off in less than 50 feet. Its landing ground roll is about 20 to 30 feet, with a touchdown speed of seven miles an hour. Scheduled for further tests by Army personnel, the B-8M weighs only 247 pounds empty, but can lift a payload of 300 pounds.

The portable one-man back-pack helicopter weighs 68 pounds empty and has a gross takeoff weight of 270 pounds. Power



Portable one-man helicopter

is supplied by two tip-mounted jet engines that weigh only five pounds each, have no moving parts, and provide 17 pounds of static thrust each. It uses liquid propane for fuel .- News item.

Plastic Cartridge Case

A lightweight plastic cartridge case is being considered as a replacement for the Army's conventional brass case. The plastic case was developed by Navy scientists and will undergo tests and cost studies by the Army.-News item.

Versatile Troop Carrier

Originally designed for use in the Arctic, the amphibious cargo or personnel carrier, M76 Otter, has a speed of 28 miles an hour and a range of 200 miles. The



US Army Photograph
Amphibious carrier M76 Otter

four-ton Otter is armed with a caliber .50 machinegun, can cross a trench 60 inches wide, and climb obstacles 18 inches high.

—News item.

Army-Navy Turboprop

The AO-1 Mohawk is a two-place, twinengine aircraft designed to operate from
small unimproved fields. It is distinguished
by a high tail and a midwing, with its
T-53-L-3 engines mounted in nacelles above
the wing. It has a wingspan of 42 feet; it
achieves maximum visibility by use of a
bubble canopy. The Mohawk will be produced for both the Army and the Marine
Corps, and represents the first joint ArmyNavy effort to develop aircraft to meet
a common need.—News item.

Mighty Centrifuge

A giant centrifuge which can exert a force equal to one hundred times the pull

of gravity is in use in testing intercontinental ballistic missile components. The machine is designed to whirl objects weighing up to one ton at 121 revolutions per minute at the end of a 20-foot boom. At full speed, items under test are moving 170 miles an hour. The device is designed to subject test components to extreme of temperature and acceleration simultane ously. Temperatures ranging from 100 degrees below zero to 350 degrees above cas be created in the missile-shape compart ment at the end of the boom. In tests the



Centrifugal test device

centrifuge has accelerated to 104 revolutions per minute in 143 seconds, and braked to a stop from 107 revolutions in 78 seconds.—Commercial source.

Air-Transportable Radio Terminal

A compact air-transportable radio communication terminal with an antenna that inflates like a balloon is now under evaluation tests. Capable of being packed into two metal chests that serve as shelters

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aircraft tire. Th when the station is erected, this terminal provides mobility for use in the radio communication system called "Transhorizon." This method, based on the scattering effect of radio waves, provides extremely reliable radio communication for ranges of 50 to 150 miles without intermediate relays. Up to 12 voice or 96 teletypewriter messages can be handled simultaneously. The system operates in the ultra-high frequency range just above that currently used for television channels. Two dishshape inflatable antennas are utilized.

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US Army Photograph
"Transhorizon" air-inflatable antenna

These antennas are 15 feet in diameter and are designed to withstand winds up to 70 miles an hour, can be dismantled and stored in a space about 3 by 2 by 7½ feet, and weigh about one-third as much as a conventional antenna.—Official release.

New Tires

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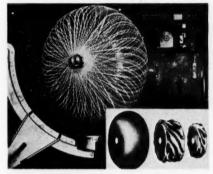
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Recent developments in tires include an all-synthetic truck tire and a radical type aircraft landing gear based on a folding tire. The all-synthetic truck tire, presently made only in the widely used 9.00 by 20 size, is made of butyl and will not deteriorate in storage. Tests under highway and cross-country conditions have demonstrated that the butyl tire is at least equivalent to the military tires now being manufactured. A program is under way to



Folding tire for aircraft

develop butyl tires of other sizes for military use.

The folding tire uses a continuous hightensile nylon cord wound around the body of the tire somewhat like spokes in a bicycle wheel. This makes possible a much larger tire without an increase in weight. It has an automatic vent and inflation system which provides normal high pressure for runways and low pressure for unprepared fields. It also permits complete deflation and folding when the landing gear is retracted. When collapsed, the tire is reduced to about one-eighth its normal size.—News item.

Missiles Into Production

The Army's Jupiter and the Air Force's Thor intermediate range guided missiles have been ordered into production for operational purposes. Both of the 1,500-milerange ballistic weapons have been test fired successfully, and are expected to be available for operational installation by the end of 1958.—News item.

ICBM Tested

The Atlas intercontinental ballistic missile has been fired successfully from the Cape Canaveral Missile Test Center over a limited range of several hundred miles. The Atlas, officially designated the SM-65, is powered by liquid propellant Rocket-dyne engines, and is designed to deliver



Atlas in flight

a thermonuclear warhead at intercontinental ranges. Rocketdyne engines also are used in the Thor, Redstone, and Jupiter missiles.—Commercial source.

Infrared Communications

Under test at the Electronic Proving Ground in Arizona is a device capable of transmitting voice over an infrared light wave. The system, which has line of sight characteristics, feeds radio or wire messages into the infrared transmitter electrically. The output at the receiving end can be fed into a radio transmitter or a telephone line. The infrared rays, which are invisible under normal conditions, car be picked up and passed on by relay stations on hilltops to extend the range of the system.—News item.

Transistorized Mine Monitor

A transistorized underwater telemetering system is in use for monitoring the operation of moored mines in the Navy's Ordnance Laboratory. In this system as approaching vessel is detected by the mine's firing mechanism and a signal transmitted to a receiving hydrophone that sends the signal on to the shore control station. This replaces the system which utilized direct cable connections to the mine. The monitoring cable formerly was placed in the mine mooring cable and was subject to frequent breaks.—News item.

Tilt-Wing Tested

A rigorous program of free flight tests of a model of the X-18 tilt-wing VTOL research aircraft has been completed successfully. The powered model of the X-18 has a six-foot wingspread and incorporate full provision for remote control of wing tilt, propeller pitch, and power changes. The next step in the development of the tilt-wing concept is the flight test of the full-scale aircraft that is in an advanced stage of construction. The X-18 is powered by conventional propellers and turbines.—News item.

Gas Detectors

A portable automatic nerve gas detector has been developed which flashes a rellight and sounds a buzzer when even very small traces of nerve gas are discovered. It also can set off alarms some distance away to warn others who are not in the immediate area. The set is equipped with filters so that it can operate in heavy smoke or fog, and can be adapted for gas detection in civil defense work.

Another detector operates on standard electrical current and is designed to pro-

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tect personnel at guided missile sites from gas given off by fuming nitric acid which is used in some rocket propulsion systems.

—News item.

Air Defense System

The Missile Master system (MR, Aug 1956, p 66), now operational at Fort Meade, Maryland, and planned for installation at New York City and other strategic



US Army Photograph Missile Master height finder radar

industrial and population centers across the nation, combines reliability and flexibility to an unusual degree. Critical elements are provided in duplicate, and it can continue in operation with one or more major elements inoperative. It is designed to utilize information made available by the Air Force SAGE interceptor aircraft control system or to generate data from its own surveillance radars. An unusual feature of the Missile Master is the "friendly protector," who assures that the Nike missiles are not fired at friendly aircraft.—Official release.

Sonic Cleaning Device

A sonic cleaning tank has been developed which cleans jet aircraft engines with high frequency sound in a fraction of the time previously required. It is expected that the system will save a quarter of a million dollars worth of cleaning chemicals a year. Present cleaning systems require approximately 37 man-hours per engine. The sonic cleaning installation is expected to reduce this time to about six man-hours per engine.—News item.

Variable-Speed Turbine

Now in the design stage and scheduled for production is a variable-speed gas turbine for flying platforms (MR, Jul 1955, p 64) under evaluation by the Army. The new engine will be designated the YT-66 and will be an adaptation of the constant-speed YT-62, originally developed for use in one-man helicopters.—News item.

Atomic Ship Named

The United States first atomic-powered merchant ship (MR, Oct 1957, p 64) will be named the NS Savannah. The "NS" stands for nuclear ship.—News item.

GREAT BRITAIN

Ballistic Missile Bases

Under terms of a United States-British agreement, four squadrons of intermediate range ballistic missiles are to be based in the British Isles. Three of the squadrons will be British, and the fourth will be under the United States Air Force. The first squadron has been promised by the United States before the end of 1958.

The delivery to Great Britain of two types of United States short-range missiles, one for antiaircraft use and the other surface-to-surface, also has been announced. The antiaircraft missiles permit the withdrawal of obsolete United States antiaircraft guns from the British defenses.—News item.

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Controllable Rocket Engine

The De Havilland Spectre, controllable-thrust, liquid propellant rocket engine used in the S-R.53 rocket- and turbojet-powered interceptor, utilizes hydrogen peroxide and kerosene as fuel. It has a controllable thrust through a wide range, can perform repeated starts and stops, and is designed to the same rigorous requirements of long life and reliability as any normal turbojet engine intended for aircraft use. The liquid hydrogen peroxide also serves as a coolant for the exhaust nozzle. The Spectre is 56.5 inches long and 32 inches in diameter.

Napier rocket engines are the NRE 17, Scorpion N Sc 1, and the NRE 19. The NRE 17 is a low-cost missile rocket made of "nonstrategic" materials. It is a bipropellant rocket of about 2,000 pounds thrust. Since it is designed for short life, it has no cooling system for combustion chamber or nozzle. The Scorpion rocket motor has been under test for over a year in a Canberra bomber. The NRE 19 is a "cold" rocket which weighs less than 30 pounds, and is designed for installation in the tip of helicopter rotors. In this system, hydrogen peroxide is decomposed by a silver catalyst into oxygen and steam which is ejected at high velocity through the nozzle of the motor.-News item.

Aircraft Safety System

A technique that removes the hazard of fuel fires in aircraft is under flight test in a specially modified Canberra jet bomber. The system works on the principle of providing a sufficient proportion of nitrogen gas in the air space inside the fuel tank to prevent the oxygen in the air from supporting combustion. The nitrogen is stored in liquid form in a high vacuum insulated container. It is said to offer complete protection from fuel tank explosions caused by lightning striking the aircraft in flight, or from enemy action in combat.—Official release.

Helicopter Carrier Planned

Plans are being made to convert an aircraft carrier into the Royal Navy's first helicopter carrier. It is expected to be in service by 1960, and will accommodate 20 of the Wessex or S-58 type helicopters now on order. Each of these aircraft is capable of carrying 14 to 15 fully equipped soldiers.—Official release.

Flexible Oil Barge

Flexible oil barges that can be folded into an easily transportable bundle are under operational test. The barge, consisting of a flexible tubular nylon bag, weighs less than one two-hundredth of the cargo it carries. When filled, the containers lie low in the water, about 80 to 90 percent submerged, and are filled and emptied through a hose pipe attached to the stern. A 67-foot model, which is three feet in diameter and carries 10 tons of cargo, has passed rigorous initial tests successfully. The cost of the flexible type barge is expected to be about one-seventh of the cost of a conventional tanker.—Official release.

VTOL Airline Transport

Now in the test flight stage of development, the revolutionary 48-passenger Rotodyne is designed to carry 9,000 pounds of cargo to a range of 400 miles. It has a planned speed of nearly 200 miles an hour and a gross weight of 39,000 pounds. The Rotodyne is essentially an orthodox twinengine airliner, powered by two 3,500horsepower turboprop engines. A 90-footdiameter, four-blade rotor is mounted above the fuselage with each rotor blade equipped with a pressure jet unit at its tip. For takeoff, compressed air from the engines is piped through the rotor blades and burned with fuel in the tip jet units. The resultant lift from the rotor takes the Rotodyne into the air as a helicopter. At operative height the engine power is transferred to the two forward-facing propellers and the big aircraft then flies forward as a normal airplane with the rotor autorotating and sharing the lift with the fixed

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Rotodyne in initial test flight

wing. During vertical takeoff, the conventional propellers are set at zero pitch and used for directional control. The principal use for the *Rotodyne* is expected to be in short haul work between city centers. It also is claimed to have many military applications.—Commercial source.

Radar-Controlled Gun

British antiaircraft gunners are being armed with the latest Bofors light antiaircraft gun for use against low-flying



L.70 light antiaircraft gun

aircraft. The new weapon, designated the L.70, can fire 240 rounds per minute and incorporates a new type of radar and computer. It has a higher muzzle velocity than

previous Bofors weapons. While it can be trained by hand when necessary, the L.70 is pointed automatically when the radar-computer fire-control system is in use.—News item.

POLAND

Aircraft Advancement

New Polish aircraft developments include a two-place trainer, the production of Russian-designed fighter aircraft, and the redesign of a two-engine transport. The two-place trainer is the S-4 Kania-2, a parasol-wing monoplane which has completed initial flights. It is powered by a 160-horsepower M-11 radial engine.

Russian-designed MiG-15 and MiG-15bis fighter aircraft now are being built under license in Polish factories. The MiG-15, powered by a RD-45 turbojet engine with 6,000 pounds thrust, is given the Polish designation of LIM-1 and is being produced in Warsaw. The MiG-15bis, which differs from the standard MiG-15 in having perforated wing flaps, is powered by a VK-1 jet engine with 5,955 pounds thrust. It has been given the Polish designation of LIM-2, and is manufactured in the city of Mielec.

A Polish-designed, twin-engine, mediumrange transport is being redesigned as a four-engine aircraft. Utilizing piston engines, it will be offered for foreign sale at what is said to be a relatively low price. It will be put into operational use by the Polish airline, LOT, before being offered for sale to foreign markets.—News item.

SPAIN

Underground Storage

Seven huge underground vaults are being constructed by the United States Navy in a mountain in the northwest tip of Spain for storage of oil, aviation gasoline, and ammunition. The project, which will cost over 11 million dollars, provides storage for at least 25 million gallons of petroleum products as well as an undisclosed amount of ammunition.—News item.

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WEST GERMANY

WEST GERMAN ESTIMATE OF CAPABILITIES OF SOVIET TACTICAL AIRCRAFT IN 1960

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Copyright "The Aeroplane"

Rocket Arsenal

Present plans for the rocket arsenal of the West German armed forces include a tactical infantry rocket of unspecified type and the French-designed SS 10 and SS 11 antitank missiles (MR, Oct 1956, p 72). Other missiles scheduled for development to meet European requirements are a ground-to-ground guided missile similar to the Matador and a ground-to-air defense rocket based on the Nike.—News item.

First Air Force Squadron

The first squadron to be formed in the West German Air Force is equipped with French Noratlas transport aircraft. The twin-engine Noratlas, which is also in

service with the French Air Force and is used by a number of civil airlines, is powered by two 2,040-horsepower British Hercules engines built under license in France.—Commercial release.

Aircraft Negotiations

Negotiations concerning the possibility of German-licensed construction of the S-R.177, a mixed-power fighter developed from the earlier S-R.53 have been discontinued. The S-R.177 was designed as a complete weapons system, and armed with the Firestreak rocket (MR, Jul 1957, P70). The aircraft was reported to be capable of a speed of 2,000 miles an hour at altitudes up to 19 miles, and equipped for in-flight refueling.—News item.

SWEDEN

Missiles Tested

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Two locally designed and built missiles, designated as types 304 and 315, are undergoing exhaustive tests. The type 304 is an air-to-air guided missile planned for use by the A 32 Lansen attack aircraft (MR, May 1957, p 71). Started in 1950 and first fired from an aircraft in 1955, this missile is equipped with airplane type wings and uses foreplanes for control. The type 315 has been test fired by the destroyer Halland (MR, Jun 1957, p 75). It is launched by four booster rockets and powered by an air-breathing engine.—News item.

FRANCE

Joint Research

A joint armament research center has been set up by France and West Germany. The emphasis of the joint research center, which is to be situated in Alsace, France, will be on tactical rockets and ballistic missiles. It has been reported that the French-German enterprise is to be headed by a German specialist, with the financing handled by the two governments.—News item.

Rockets Tested

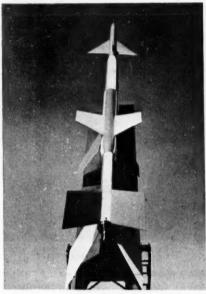
In recent tests the Veronique rocket (MR, Dec 1957, p 70) carried more than 120 pounds of scientific instruments to an altitude of 40 miles. An improved version of the Veronique will lift the same load to a height of 135 miles. The improved Veronique is 23 feet long and weighs 3,000 pounds at takeoff. It will attain a speed of 4,300 miles an hour by the time it reaches an altitude of 20 miles, and is said to be able to carry small animals aloft in its cargo compartment.

Two other types of rockets, the *Monica IV* and the *Monica V*, also have been announced. The *Monica IV* has reached an altitude of 50 miles with a 33-pound payload and attained a speed of 3,100 miles

an hour. The $Monica\ V$ has reached an altitude of 100 miles in tests with a maximum speed of 3,500 miles an hour.—News item.

Three-Stage Rocket

The experimental three-stage rocket Orena, used in high-altitude research, is capable of speeds in excess of Mach 1.5.



French Embassy Press and Information Division Photo

Orena research rocket

Both the second and third stages of the Orena carry electrical recording devices, and are equipped for parachute recovery.

—News item.

AUSTRALIA

Slow-Flying Plane

The Fawcett 120, a four-seat, high-wing monoplane is in the flight test stage of development. The 120 is claimed to have a minimum flying speed of 25 miles an hour.—News item.

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NORWAY

Joint Mapping Project

The United States Army is helping to make a complete new map of Norway. Field work on the mapping project is Norwegian, with United States personnel doing the photographic construction and reconstruction. The map will be on a scale of one inch to a mile.—News item.

CANADA

Big Interceptor

The CF-105 Arrow, a supersonic, deltawing interceptor designed for speeds up to 1,600 miles an hour, is in production for



CF-105 twin-jet interceptor

the Royal Canadian Air Force. The 34-ton Arrow also will function as an attack bomber and will be able to deliver nuclear weapons. The two-seat, twin-jet interceptor is powered by a specially designed Iroquois engine. It has a wingspan of 50 feet and is almost 78 feet long, and its bomb bay is said to be as large as that of a B-29 Superfortress.—News item.

JAPAN Atomic Office Opened

The United States Atomic Energy Commission (AEC) has opened its fourth overseas office to furnish advice on the peaceful use of atomic energy. The new Tokyo office will provide consulting serv-

ice and implement United States atomic power agreements with Japan, Nationalist China, South Korea, the Philippines, New Zealand, Australia, and Thailand. The three other AEC offices are in London, Paris, and Buenos Aires.—News item.

Japanese-Built Jet

Two training aircraft, the first jet planes to be designed and built in Japan, have been delivered to the Japanese Self-Defense Board. The aircraft are equipped with British engines, but it is planned that future production models will use a locally manufactured powerplant. The Japanese defense forces presently are equipped with United States jet planes.—News item.

USSR

Reactor Systems Tested

Four different reactor arrangements will be tried out in the next three years as a step in the Soviet program of development of an atomic-electrical power system (MR, Aug 1956, p 70). The systems to be tested include a "boiling thermal reactor" using ordinary water as a moderator and coolant; and a "thermal carbon reactor" using liquid sodium as a coolant. The third system to be tried will use a solution of uranium salts as fuel, and the fourth—considered to be especially promising—will be a "fast-breeder" reactor using plutonium and Uranium 238.—Newsitem.

Missile Stockpile

According to a newspaper account of a report received by the Senate preparedness subcommittee, the Soviet Union has a stockpile of 20,000 ballistic missiles and a productive capability for 2,000 missiles per month. About 30 percent of the stockpile is said to be missiles with a range of 1,200 miles, while the remainder is made up of missiles with a range of 800 miles.—News item.

FOREIGN MILITARY

DIGESTS

The Illusion or Reality of the Absolute Weapon

Digested by the MILITARY REVIEW from an article by General Charles Ailleret in "Revue de Défense Nationale" (France) July 1957. Translation by Mr. LaVergne Dale, Leavenworth, Kansas.

Attachment to dogmas has destroyed more armies and caused more battles and human lives to be lost in war than any other cause whatever.

-General J. F. C. Fuller

THE person who attempts to adapt strategic doctrine, tactical methods, and the organization of armed forces to modern weapons, especially at this fast-moving stage of weapons development, finds himself confronted with the most profound and complex enigmas. Even with a valid line of reasoning, a clear mind, and a creative imagination, a large measure of luck will be needed to assure success. The experience of the past shows clearly that in this domain, error is the rule and success the exception.

It is, therefore, necessary that those who intend to work in the future assure that all the odds are on their side. They must not, through negligence, add to the unavoidable causes of error any errors which proper precautions should have eliminated.

Among the most frequent of such errors are the employment of expressions or terms whose meanings are not precisely

defined. The more suggestive and striking they are, the more dangerous they become and the more they lend themselves to intuitional rather than logical interpretations.

It is clearly evident that vague terms or expressions engender grave misunderstandings. Individuals often attach different meanings to such words, and then cannot agree with one another because they are not speaking the same language.

They may—and this is most serious—be employed with different meanings during the course of one and the same study. The result is surprising absurdities in the conclusions drawn. Examples of expressions of this type are dominant weapons, ultimate weapons, or absolute weapons.

Two Concepts

It is often heard declared, almost always by the enthusiasts of "strategic bombing," that in the nuclear weapon we

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at last have an absolute weapon at our disposal.

Naturally, the opposite concept is expressed in equally definitive terms affirming that the atomic explosive is, after all, only a weapon.

Those who dispute the claim that the nuclear weapon is to be regarded as an absolute weapon base their contention almost always on history and on principles and doctrines. Experience shows, they say, that down through the ages new weapons have never caused the definitive disappearance of the weapons which preceded them. They only joined themselves with the older weapons, augmenting or developing their power. They have, they concede, progressively modified tactics, strategy, and the forms of war, but they have never wholly revolutionized them. The principles of war, in particular, are invariables which modifications of armament cannot perturb.

Finally, however terrible the first appearances of the new weapons may have been, and however great the terror they inspired in the minds of men, some means of defense always have been found of reducing, at least to an acceptable risk, the immense perils which it appeared, a priori, would result from them.

They affirm that these general, historical laws are applicable to the nuclear weapons, which will only complement the arsenal of the classical weapons, and that their effects surely will be reduced considerably by the advances of antiatomic protection.

From this they draw the conclusion that although nuclear weapons will modify the problems of war, they will not make these problems impossible of solution. Their influence will not bring about a total upset of strategic balances.

All this, we hasten to say, is very doubtful. To begin with, modifications of armament have resulted in a complete change in the customary forms of war in the past. After 1870, for example, the power of weapons still was sufficiently limited for movements under fire and the assault of positions to be possible when necessary. But improvements in automatic weapons and rapid fire field guns created an absolutely new situation in 1914. After a few unfortunate attempts at maneuvering, the forces facing one another were obliged to seek cover in a network of trenches protected by barbed wire and to remain there until new advances in armament (tanks and light bombing aviation) enabled them to emerge.

There is no need, however, of casting doubts on the alleged lessons of military history. It suffices to remark that even though they were strictly accurate, they would not be applicable to the case of the nuclear weapons.

Coefficients of Power

The phenomenon introduced into warfare by these weapons is characterized, as a matter of fact, by an order of magnitude which is wholly incommensurate with the weapons of even the recent past.

If, for example, we consider the change from the rifle of 1870 to the automatic weapon, what do we find? Each time a soldier fired the single-shot rifle he had to load his weapon, bring it to his shoulder, aim, press the trigger, open the breech, and remove the shell from the firing chamber before he could get ready to fire again. He was able at best to fire four shots per minute.

The automatic platoon weapon is capable of 300 shots per minute. Since this platoon is composed of around four men, it all adds up to the same as if each of these men fired 75 shots per minute.

From the point of view of the firepower of each man, the efficacy of the automatic weapon as compared to the single-shot rifle is represented by a coefficient of magnitude of about 20.

By a calculation of the same type we

should find analogous results in the case of the changeover from the field gun with fixed mount to the rapid fire field gun with a recoil absorbing mount.

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Nevertheless, these variations in the efficacy of the fire of the infantry and of the light artillery, represented by modest coefficients which certainly do not exceed a few times 10, sufficed to transform a war of movement into a war of position and attrition.

When the nuclear weapon is considered in comparison with preceding explosives, the multiplying coefficient is not represented by a few times 10 but, depending on the case, between a few hundreds and tens of thousands.

If we compare, for example, their actual efficacies against various categories of targets, we find that a nuclear weapon, say of 20 kilotons, is the equal of between 1,500 and 3,000 tons of classical weapons. If this weapon weighs—and this is probably a maximum—a few hundred kilograms, we see that the multiplying coefficient of the actual efficacy per unit of weight of the weapon will be from 1,500 to 3,000, at the least.

If we refer this efficacy not to the weapon but to the personnel putting it into action, we find that a single plane carrying a single weapon is equal to between 300 and 600 planes each carrying five tons of bombs—and the coefficient here is several hundreds. Thus an artillery piece hurling an atomic projectile is equal, for the execution of a powerful concentration of fire, to at least several thousand cannon. In this case the coefficient definitely exceeds the third power of 10.

If we made the same estimates for thermonuclear devices, which are much more powerful, we arrive at still larger coefficients. A single plane dropping a single bomb of this type would be capable of wiping out all of Paris and its suburbs. The same destruction by classical means would necessitate the dropping of several hundreds of thousands of tons of bombs by several tens of thousands of planes. The coefficient attains the fourth and perhaps the fifth power of 10.

Up to the present time we have had to do with advances in armament represented by coefficients of increase of firepower that have been relatively limited and never exceeding a few times 10. We now have to do with a revolution which is represented by coefficients from 100 to 10,000 times greater.

Parallel Development

The battle between the cannon and armor developed in a classical world which could be considered practically homogeneous. When the bullets of the automatic weapon or the fragments of the bursting shells prohibited the infantry from maneuvering without cover, protection was found in the tank.

Then, when the tank became the king of the field of battle, cannon were perfected to fire projectiles which could pierce the toughest armor.

The battle between the projectile and armor continued to effect a sinusoidal path of development because it was a matter of the parallel evolution of the classical technique of destruction and the classical technique of protection. They alternately assumed, for greater or lesser periods of time, superiority over one another. At the same time they developed, as considered over long periods, at an almost identical rate.

The nuclear explosives have intruded into this parallel development and caused the means of destruction to make an unbelievable leap in magnitude of effectiveness.

To meet this new technique of destruction successfully, it obviously would be necessary that the techniques of protection advance by at least the same degree. This can never be, however, so long as the techniques of protection continue to be classical and their means always constituted

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—allowing, of course, for normal advances —by the same earthworks, the same concrete works, and the same armors as before.

At present, nothing indicates that the utilization of nuclear energy, which makes such destruction possible, also will give us means, hitherto unknown, for protecting men, matériel, and installations against the explosions. Such a thing is neither philosophically or theoretically impossible, but in the present state of affairs it is undeniably a distant eventuality.

There are no grounds for any hope that advances in means of protection will permit us to reduce to a minimum or acceptable degree the danger from nuclear explosions directed against a target.

To be sure, in a war in which the enemy attacked only military objectives and in which he adapted the power of his bombs and the mode of their explosion to the destruction of these with a minimum of side effects, the protection of the populations by the classical means could considerably reduce the losses in the neighborhood of the objectives attacked. If the enemy desires to destroy a particular objective, however, and if he is determined to do it regardless of cost by employing the necessary number of weapons of the desired power, he most certainly can annihilate it.

The protection of an objective would be senseless, except against an attack which lacked in quantity or in power the necessary nuclear weapons to ensure the destruction or the paralysis of the objective in question.

To affirm that the nuclear weapon merely can be added to the existing family of military armament without causing major revisions of the military art is wrong. The atomic weapon, against which there is so little hope for any real protection, constitutes a disturbing factor of such magnitude that it radically modifies all our military concepts, as well as all the balances of power among nations.

Those who hold the nuclear weapon to be absolute consider it so powerful that it renders useless any recourse to the classical weapons or, at least, that it relegates these latter to roles which are less than trivial and purely accessory. It would appear that so definitive a concept is also probably far from the truth.

Effect on Tactics

One incontestable fact, however, is that the nuclear weapon greatly outclasses classical weapons with respect to massive destruction. Whether it is delivered by piloted aircraft, cannon, or a self-piloted device, it obtains its results with extreme economy, with relatively small delay, and without need for the long logistical preparations involved in the actions of force of the past. These results are vastly superior in point of efficacy and extent to those of the enormous artillery concentrations and the great aerial armadas whose hundreds of heavy bombers followed one another in imposing formations to drop their bombs on an objective of limited area.

By nature a weapon of massive destruction, its use is undesirable solely against objectives of very small dimensions, widely spaced, and concealed. The destruction of these could be accomplished only by systematically covering the entire field of battle or theater of operations. In addition to its cost, this method would result in so much destruction and so many deaths on the part of noncombatants that it is automatically excluded as a normal method of warfare.

It does not permit—and this is an essential under present-day world circumstances.—free action against objectives such as groups of guerrillas, infiltrated commandos, or parachute forces operating in the midst of friendly populations. Only the traditional weapons of the infantry and, if necessary, cannon, tanks, and the classical ground support planes will be able to act against these, adapting to the objectives

a graduated power as great as necessary but of a level permitting precise observation of the effects of the weapons put into action.

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It is not, therefore, the infantry and the other classical weapons that are called on to disappear, but it is the concentrations of these weapons in compact masses for the purpose of achieving considerable power through the addition of their individually small efforts. These masses—and principally the vast concentrations of artillery and extensive concentrations of tanks and the aerial armadas—are wholly eliminated by the nuclear weapon which is much less costly and much more flexible of employment.

Certain forms of the traditional action of the classical weapons are surely outmoded, but not the weapons themselves.

There is not much chance that we will again see several armored and mechanized divisions grouped along three or six miles of front and operating along a single axis. The large amphibious or airborne bridgeheads in which masses of troops and matériel were concentrated and the divisional centers of resistance like that of the 82d Airborne at Bastogne are formulas which, if repeated, would be wiped out immediately by a few bursts of nuclear fire.

But in other forms of action, complementary to the massive destruction of large or extensive objectives, and particularly in all their detailed, dispersed forms of action, classical weapons are very far from belonging to the past.

The truck has almost eliminated the long foot marches of infantry columns. The infantryman continues, however, to move on foot inside his billeting area as well as when he maneuvers or fights in contact with the enemy. The truck, although it practically eliminates the long marches on foot, does not do away with the usefulness of the legs of the infantryman: the latter, even in our day, spends more time afoot than in vehicles.

In the same way, granting that nuclear weapons do away with the massive actions of the classical arms, they are certainly still useful in cases where massive actions must be complemented by detailed actions or where the former, due to circumstances, are prohibited.

Under the constant and imminent threat of deterrent weapons, war may orient itself, at least for a certain length of time, in the direction of very decentralized, revolutionary forms of surface action, with the aim of overthrowing governments themselves rather than of destroying opposing forces. In accordance with this hypothesis, as dangerous as it is probable, classical weapons employed on a minor scale would play the leading role in the absence of the unleashing of atomic weapons.

Thus the nuclear weapon by itself is not able to constitute a system of armament. Such a system necessarily comprises an entire gamut of means whose echelonment of powers permits the adaptation of the military solutions to the vast variety of circumstances that may present themselves. From the modest machine pistol to the frightful bomb of six megatons, homogeniety of the system is an imperative essential. No echelon of the gamut could be omitted without the corresponding gap being used by the adversary for a maneuver to which there might be no reply. It becomes clear that the nuclear weapon cannot be considered, without many reservations, as an absolute weapon.

Complete Destruction

Up to the present, no weapon permitted the destruction of a country. To accomplish this successfully it formerly was necessary to invade a nation in order to massacre its inhabitants and burn everything one did not wish to pillage. It was necessary, that is, first to vanquish its armies in order to open the routes for invasion—a process that frequently required considerable time

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and which often was uncertain. Thus the complete destruction of the country could be achieved only by a hand-to-hand struggle with it.

About 30 years ago the partisans of Douhet's theory believed that aerial bombing could inflict sufficient losses on an enemy country to render it no longer able to fight. As a matter of fact, experience showed that the most violent classical bombing attacks could cause grave injuries to the population and the war economy of a country, but that they were not capable of annihilating it. These injuries could not but aid—effectively to be sure, but only aid—in putting the armies of the enemy out of action and in accomplishing the invasion which alone is destructive of the capabilities of a nation.

The material means for the attack of a country from a distance were not sufficiently powerful for their action alone to be able to paralyze or kill it. Only a hand-to-hand procedure leading to invasion and occupation was capable of this.

Today, on the contrary, there exists a weapon—the nuclear weapon—capable of killing a nation, even a very large one, from a distance. A relatively small number of thermonuclear bombs can quickly wipe out all the large cities with their administrations, industries, railway centers, telephone, telegraph, and radio centers and, above all, their populations. Tens of millions of dead and tens of millions of injured overloading the medical services beyond all measure would immediately result in the complete arrest of the national economy with definitive and catastrophic consequences.

A few high-power contaminating bombs, complementing or taking the place of this frightful action, would render large sections of the country uninhabitable for long periods of time and completely paralyze and perhaps eliminate a very large proportion of the population.

Absolute Weapon

The nuclear weapon, therefore, possesses the novel characteristic of being the first capable of knocking out a nation from a distance. It is on the basis of this characteristic that one may designate it as an absolute weapon.

In this sense it is an absolute weapon, on the same basis as the machine pistol is an absolute weapon between individuals, because the latter permits killing one's adversary from a distance, rendering all hand-to-hand combat unnecessary.

But it is no more an absolute weapon than is the machine pistol between individuals because it is not applicable to all cases of combat. The man who lives in regions which are still poorly policed, where security is only relative, acts intelligently in not entrusting his defense solely to firearms. He must also be trained to make use of his fists, of his feet, by the techniques of close combat or jujitsu, so as to be able to hold his own against all attacks whatever their form or violence.

The same is true of nations or groups of nations. Those who do not possess the nuclear "deterrent" have lost all real power in advance. They are obliged to yield at the least hint of atomic action on the part of those who possess it.

Those who possess only nuclear power, because they consider it as absolute and, consequently, sufficient in itself, are not shielded from other more or less subtle and indirect forms of aggression. The progressive infiltration of enemy elements, the creation of subversive forces aided, financed, and armed from without, may not find a solution in the employment of the nuclear "deterrent."

It is in this sense that the latter cannot be considered as absolute.

Combined Action

It should be noted that even though nuclear and classical forces are mutually complementary in the constitution of a co-

herent military system, it is not obligatory that they act in combination.

Many authors attempt to imagine the form of the battle of the air-ground or airnaval forces in the framework of the employment of nuclear weapons. It is, obviously, an interesting hypothesis, but it is, perhaps, neither the only one nor even the most probable.

The unleashing of nuclear fire without reserve being admitted, it is entirely possible that this fire alone will suffice for attaining the decision and that the airground or air-naval forces will be purely and simply paralyzed during the time that it will take to attain this decision.

The "classical" forces then would be destined either for use in war of the revolutionary type, in which nuclear weapons would not be used or would be used only with very strict limitations. Otherwise, they would constitute, in time of peace, the shield which would permit definite recognition of an aggression and of putting into action retaliatory nuclear forces of destruction.

Both nuclear and classical forces are necessary, therefore, for constituting a coherent military system. Although they may have to act in close cooperation, it also is possible that they would have to be employed successively and, perhaps, one in the absence of the other in accordance with existing circumstances.

Would we have to conclude, from this, that a proper military system must be the sum of a classical system of the former type and of a nuclear system? Since the economies of the countries could no longer bear the enormous costs of the classical systems, such a solution obviously would be unthinkable.

As a matter of fact, the nuclear system permits mass destruction at much less cost than the former classical system. Moreover, the most costly elements of this system were those which are aimed precisely at these massive effects. The very large

quantities of munitions that had to be produced, transported, and fired, and the enormous quantities of tanks and planes which had to be concentrated and maneuvered at the cost of prodigious consumptions of fuel and replacement parts, no longer make sense. It is the classical armies adapted to surface and detailed operations that will have to continue to exist.

Obliged to maintain large forces in order to be able to saturate the vast expanses on which their activities may have to take place, such conventional forces should no longer have to feed their units with munitions and heavy matériel save at a rate much inferior to that of former times. They should be much lighter than the former classical armies—at least in times of active operations. Hence we may hope that the total of the modern system, nuclear forces plus classical forces, will be less of a burden to the national economies than the former purely conventional systems.

Conclusions

The expression absolute weapon should be abandoned and replaced by a paraphrase which although longer and more cumbersome would cause the text, where used, to gain in clarity and preciseness whatever it had lost in conciseness and elegance.

It must be stressed that it is certain forms of action of the classical weapons that are condemned by the existence of the nuclear weapon and not these weapons in themselves. A coherent system of defense must be able to face all forms of attack which demands that it comprise at the same time both nuclear and classical weapons.

As for the quantities of heavy classical weapons that it is best to retain, no really concrete factor permits an accurate definition. The proportions best suited for maximum effects probably will remain, for a long time, one of the great questions that will face the organizers of the armed forces.

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There are at least two categories of weapons in whose creation it seems that a country will be sure not to lose its money, categories which appear destined to constitute the two essential poles of war in the years to come: a nuclear force capable of acting as a deterrent and, if necessary, as a means of reprisal, and strong and

numerous infantry forces, well-trained, well-armed and equipped, solidly officered, and well-commanded. These forces must be trained for the gamut of missions that may be entrusted to it, whether for exploiting the effects of the atomic weapon, or in the framework of ground operations against subversions of all types.

Logistics Are Logistic

Digested by the MILITARY REVIEW from an article by Lieutenant Colonel A. Green in the "Australian Army Journal" June 1957.

THERE is an alarming and significant coincidence between the military noun "logistics" and the mathematical adjective "logistic." The military term logistics was, of course, imported from the American adaptation of the French for quarters (the French General de Loges is literally Quartermaster General) to mean the art of military movement and maintenance; and "logistic" describes the mathematical processes of logarithmic functions. This resemblance is so close in our modern systems of military administration that any assumption of real similarity would be pardonable. The administrative echelons in a modern army increase progressively from front to rear, as though obeying some fundamental law of military mathematics. and, despite a wailing chorus of "cut the tail," the administrators seem powerless to remedy the situation.

In a simpler age the Indian frontier soldier was keenly aware of the inevitable incremental factors which limited the payload and radius of action of his animal transport. Thus if the daily ration of a mule was one-tenth the payload, one mule in 10 carried forage, and for every 10 forage carriers another forage-carrying mule was required. Furthermore, at a radius of three days' march from base, apart

from a basic requirement of six days' forage, an additional factor had to be included for the domestic consumption of the transport, thus considerably reducing the carrying capacity within a mobile force.

A common and exemplary economy of those days was the dumping of officers' bulky valises found to be overweight. This may be regarded as a parable for our own time. A similar but more complex incremental factor lies at the root of the present administrative problem, but the remedies, alas, are not so obvious.

Top-Heaviness

It is an accepted belief that an inflated administrative tail is detrimental to the fighting efficiency of an army. Therefore, it is relevant to examine the reasons for this belief. They may be summarized in the following manner:

1. Administrative manpower subtracts from the fully combatant potential strength of the forces in the field.

- 2. An unnecessarily high proportion of rear units consumes additional tonnages which might be available, in the form of ammunition and fuel, to the fighting formations.
 - 3. Enlarged administrative installa-

tions increase the vulnerability of a force to air and ground attack, and may even constitute objectives and assets to an enemy who plans to adapt them to his own offensive use.

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 Unduly heavy administrative overhead imposes an unnecessary drain upon the belligerent nation's economy and manpower.

Any generalization that the administrative "tail" is bad in itself is nonsense. During the Middle East campaign we saw the extraordinary picture of the War Office trying to ship an extra infantry division to a heavily committed Wavell who was urgently insisting that they send administrative units, not fighting arms. His army was deficient of transport and depot units, and even accommodation for his five months' reserves.

Much play is made of the convention that forward units are worthy and rear units ignoble. This was once true in linear warfare, but may be less valid in area warfare. Indeed, the "tail" may, at last, be more vulnerable than the "teeth."

It also is usual to place stress on the inferior discipline and morale of "tail" units. This criticism frequently has been justified, but it is not necessary that administrative units should be lacking in the power to hit back or, if required, aggress. Army Air Support Control units in Tobruk, Royal Army Service Corps units at Dunkerque, and Royal Indian Army Service Corps units at Imphal all have proved this feasible in the past. It is a matter of policy, leadership, and training to develop "tail" units with a sting. On balance, it must be admitted that any inflated "tail" is a liability, a waste, and a reproach to the stomachs and "teeth" which it feeds, and every effort must be exerted to trim the "tail" to a reasonable size.

The Nuclear Threat

Under the nuclear threat that process becomes still more necessary. The mass

destruction weapon is more effective in the higher kilotonnage, and functions best as a strategic weapon against the conglomeration of men and material in rear areas. The recent British War Office announcement that, because of the vulnerability of large forces and masses of material to nuclear attack, the government would dispose of surplus equipment and vehicles, seems to derive from the syllogism that reduced holdings offer lesser targets and, therefore, facilitate military operations in nuclear war.

The logical deduction is that in nuclear war, forces and material in dispersed smaller holdings offer lesser targets, but the risk is so great that stocks must be dispersed, concealed, and multiplied to ensure than an essential level of stocks will survive nuclear attack.

In fact, Field Marshal Montgomery recently publicly doubted whether the present logistical system could support nuclear warfare in the future. This conclusion leads to quite different measures—such as the stockpiling of war material of all types—and detailed, carefully planned dispersion. This does not decrease the "tail" which must inevitably undergo changes and extensions.

The Root of the "Tail"

If the modern administrative overhead is examined and simplified, it generally can be attributed to one or more of the following factors:

1. Weight of Material.—The justifiable desire of field commanders to build up such amplitude of ammunition, engineer equipment, and supplies as will ensure outright superiority over the enemy. This leads to concentration of manpower and material, in turn demanding services and accommodation.

2. Administrative Insurance.—The modern practice of accumulating adequate surpluses of personnel, units, and material to guard against all the foreseeable requirements and accidents of war. These

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reserves are functions of the initial quantities listed above.

- 3. Personnel Welfare.—The endeavor to produce an ideal state of personal wellbeing in the soldier by making available the maximum of urban comforts and a convincing degree of personal care. This demands a high proportion of supplies and services, lacking in immediate military significance.
- 4. Systems of Organization.—The creation of establishments and formations designed to be functionally independent and self-sufficient, thus enabling the commander to operate in isolation whenever necessary. Such systems can lead to duplication and waste.
- 5. Specialization of Manpower and Ma-/terial.—The use of special equipment, de-/manding skilled operation and servicing, to confer technical superiority. This modern trend exempts many soldiers from hitherto accepted elementary military duties and creates privileged classes of specialists, with attendant domestic trains.

All these factors are accepted as valid in modern war, but they also contribute to the current state in which only half of the army in the field is available for the fighting arms, because the other half is preempted by the "tail." At the same time, we must recognize the fact that divisional frontages, mobility, and firepower have increased manifold while the "tail" has been growing.

Yet we stand reproved that other armies, notably the Russian, apparently can retain their desirable fighting characteristics and, at the same time, manage with a Manx tail or an equine dock. Other Iron Curtain armies, such as the Chinese Communist Army, must encounter acute problems of manpower overheads when they are relying on man-pack transport and coolie engineer work. They can offset this partially by keeping personnel amenities at a primitive level, a solution which is denied to western democratic armies.

Accumulation of Material

The western democracies have primary reasons for insisting on high levels of war material as an essential condition of operation. It is a logical outcome of their high productive capacity, which has far exceeded that of any potential opponents over the past 20 years, and of their possession and access to the necessary raw materials.

It also is a necessity for them, in obedience to humane and demographic factors, to economize on scarce manpower, particularly if expenditure of material—for example, ammunition—will help effect that economy. Thus during the last war the Western Allies did not employ formations in solid phalanxes on narrow fronts as did the Russians, and invariably aimed to provide a greater volume of supporting fire than did the Japanese.

The quest for more effective vehicles and weapons is ceaseless. Some of the results of development assist in lessening overheads, for example, lighter or simpler weapons. Other results complicate the problem, for instance, a heavier tank uses more fuel, requires more servicing, heavier ammunition, and larger transporters, in their turn requiring stronger bridges, better roads, and more road maintenance—even larger LST's. At every stage such a weapon's development adds to the administrative "tail" in vehicles, depots, craftsmen, and engineer effort.

The demands for outright material superiority are not confined to the land forces. The air component of the field army also is a voracious consumer of material. Thus an airfield construction group of the World War II type needed as much transport to move and support it as would constitute the third line transport of an army corps.

Modern jet aircraft, having greater tire pressures calling for heavier runways, presumably will create a need for more transport. They consume fuel at such rates, in terms of hundreds of tons of fuel per squadron a day, that petroleum, oil, and lubricants supply to the air force in war probably is the greatest single logistical problem, quantitatively and qualitatively.

There is no simple alternative to the material accumulations upon which we base our war plans. The use of nuclear weapons may, in time, permit the reduction of first-line ammunition scales. There seems no likelihood of engineer consumption diminishing; indeed, we may see it increase to meet the need for more overhead cover as protection against blast and heat, as well as for conventional field works. The importance of first-line stocks and expenditure lies not only in their initial call on manpower, vehicles, and accommodation, but upon their final effects as each rear echelon adds an increment for service and domestic purposes.

Administrative Insurance

Forethought is one of the great intellectual triumphs of Homo sapiens. Administrative forethought is a proved military virtue, and this specialist age has produced entire cadres of military administrators to whom these functions of forethinking are entrusted. The furnishing of material sinews of war is no longer the province of civilian commissaries.

Consequently, the administrative machine is more efficient, more complex, and probably inclined to be more self-centered, indeed semiautonomous. Above all, it is constantly at pains never to be found deficient. Thus operations of war, which must involve calculated risks constantly, are supported by logistical machinery which admits no prospect of risk. This insistence on heavy administrative insurance must, in fact, rule out many operations, because the buildup requirements dominate the project from the outset.

The system of maintenance in the field used in the British Commonwealth is an extraordinary example of mutual mistrust. It not only provides theater and operational reserves, but allows separate holdings by army, corps, or division, if desired, so that each commander retains freedom of action without having to rely on the next superior formation for immediate support.

The American and the continental systems of maintenance insist upon the responsibilities of the superior formations to the field commanders, and demand greater reliance upon that support. Elimination of some of these holdings would decrease the "tail" elements of the army, and the systems which can ensure this are worthy of examination.

The levels of reserves are an important factor in determining army overheads. A reserve cannot remain inert. Comestible commodities must be turned over; vehicles must be kept mechanically sound; and equipment, weapons, and ammunition must be housed, inspected, guarded, and maintained. These tasks require men who, in turn, require incremental services.

The calculation of reserves is an exacting administrative estimation. It depends on such data as troop strengths, methods of transport, time taken to replace stocks consumed, and the scope of projected operations. It must equate such imponderables as enemy intentions, meteorology (particularly if air transport is to be used); domestic, allied, and enemy political measures; and the inherent risks of war. The natural caution of administrators faced by such problems results in overinsurance.

Successful logisticians of World War II already are revealing that the magic formula which built their reputations was to "double it" no matter how great the original estimate of manpower or material might be. We all envied the Americans their lavish scales of equipment, but nobody would wish for the related problems of moving and providing such massive quantities under all conditions of opera-

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tions, and to ensure the backing of reserves entailed.

The levels of reserves carried in the various theaters during World War II are relevant, although they must be related to the geography and strategy of the area at the time. Thus relying on a long sea voyage, Malaya in 1941 carried about

vast theater were not underbacked, although at times the logistics were precarious.

In Burma the Allied land forces, operating over long and inefficient lines of communication, had prescribed levels of six months' reserves of certain technical supplies, and still went short at some stages



A lavish scale of supply is accompanied by massive logistical problems

a year's total stocks of certain imported material. Although the force reserves for certain air-transported and air-maintained operations in the Southwest Pacific Area were fixed at 14 days, the operations succeeded, despite the fact that the reserves never exceeded seven days and sometimes declined to the dangerously low level of one day.

The Middle East levels fluctuated greatly, from an initial 90 days to 150 days in theory, working out in practice to 120 days. Nevertheless, the operations of this

of the campaign. There can be no hard or fast rules, but overinsurance is a fairly constant tendency.

Without doubt the greatest aid to economy in reserve holdings is air transport, whether fixed wing or vertical lift. By reducing the risk of supplies being cut off, the safe level of reserves may be lowered. Moreover, one central reserve may serve a series of forces if air transport is available to transport it.

Air transport also reduces the stocks in transit in the system of transport, colloquially known as the "pipeline." Although this reduces holdings, it also removes a hidden reserve. The main attack on inflated reserves must always be intelligent, bold administrative planning, and not the familiar carte blanche hitherto accorded to the experts.

Duplication

A factor which is subsidiary to that of reserve levels, and one contributing a substantial part to this evil of overinsurance, is the wide range of stock holdings which modern perfectionists require. Thus thousands of components for vehicles and weapons are duplicated and triplicated in the various echelons of holdings on the assumption that all are indispensable, and all require several days to deliver.

Only by swifter intercommunication, for instance, teletype; swifter transport, preferably air; and by realistic appraisal of what is really essential can this aspect be improved. It is noteworthy that the first two devices entail the employment of specialist personnel and equipment, thus further complicating the pattern of military activity. The third approach entails the elimination of unnecessary refinements, luxuries, and anything not a proved necessity.

Such a reform postulates questions of the following nature: Should small components be favored, or entire major assemblies? The former require detailed fitting, whereas the latter are bulky. Should repair be carried out in the theater to save shipping, or casualties be evacuated to the main support area to save manpower and machinery? Should weapons be cheap and disposable, or built to last a generation and repairable?

It must be remembered that the choice is rarely as simple a matter as the examples quoted. It is doubtful whether much reduction can be made in the range of holdings without prejudicing the mechanization of our army, which is the source of its mobility, firepower, and intercommunication.

Welfare or Warfare?

Field Marshal Slim, in his epic history of the Burma campaign, emphasizes the adverse morale effects of bad press publicity and poor rations in the early phase of the campaigns.

Thus a success was to be reported in the euphemistic terms "Pork Sausage" and a failure in the execrated words "Soya Link"—a universally unpopular ersatz sausage.

At about the same time the Lethbridge Commission reported that the Australian military forces in New Guinea were (occasionally) getting steak in the frontline. The Japanese prided themselves on living hard, and if newspaper reports are correct, their army has revived the practice of winter maneuvers under Spartan conditions. In estimating the level of welfare amenity required by any army we must refer to the normal domestic environment of the soldier. The Turk or the Japanese may thrive in conditions which will incapacitate an Anglo-Saxon.

Many commanders regard the primitive soldier as the ideal fighter—he is content to march, fight, eat, and then clean his boots and bayonet complacently, without yearning for concert parties, home leave, or ice cream. This is a one-sided view; primitive men may have primitive virtues, but are unlikely to possess the sophisticated techniques which are so important in modern war.

The urban citizen costs more to breed and rear, but, as the more expensive product, he can achieve more in the fields of mechanization than his simpler brother—and the machine tool now is more powerful than plain muscle.

The question is, then, whether to train our men to forego the civilized amenities they have always enjoyed, or to afford them as much welfare as possible. In practice a middle course normally is adopted.

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Some simplification of entertainment, comforts, and pleasures is imposed, but the level is not reduced so low as to depress morale.

A frequent target of reformers is the ration. Such attacks often are badly timed, since modern rations are not only designed for palatability but also to ensure the calories and vitamin content essential to health. Moreover, economy in rations does little to improve the tonnages to be lifted since the ration is a relatively small portion of the daily maintenance tonnage. When purists complain, "Why can't we learn to live on a pocketful of rice" they are apt to forget these factors.

These problems of welfare amenities are similar to the traditional question of whether a horse intended to undergo strenuous winter work should be hardened and acclimatized in advance? Surprisingly, the experts say it is better to coddle the animal in a warm stable, and get it into good fat condition to prepare for the hardship. Soldiers are sentient people and will accept hardship which they know is justified, but the imposition of unnecessary discomfort is detrimental and not conducive to good morale.

Hard training is a different matter since it not only induces fitness for war but fosters pride and self-respect. Therefore, in fixing the level of creature comfort to be given to the soldier a fine appreciation is needed. It must be related to his national customs and his operational functions. There is no simple solution; excess must be avoided, but the soldier must be assured that he is not forgotten nor undervalued.

It also is a basic principle that the soldier who enters battle assured of speedy attention and evacuation if he is wounded, gains enormously in morale. Moreover, with our limited manpower we must recover every casualty as quickly as possible. Obviously, there can be little economy here; indeed, in nuclear warfare the overhead must increase.

Organization

Military organizers are addicted greatly to thematic numbers and diagrams. For 20 years the major number has been three, and the diagrams have been mainly boxes joined by straight lines in geometries symmetry. These habits of thought are convenient conventions, but can prove very expensive in manpower.

Recently Liddell Hart has attacked the corps organization of two or three divisions used in recent years by the armies of the British Commonwealth, and has called for a corps of five divisions like the 1st Australian Military Force in France. Larger multiples of components reduce the overhead.

In the lower organizational levels, units tend to be formed of self-contained "bricks" having the inherent flexibility which permits quick reshuffling of support weapons or administrative units to met changing situations. The onset of nuclear warfare changes the virtue in demand to one of maximum indestructibility coupled with flexibility.

The geometrical design gives place to something more biological in shape, which, like the amoeba when severed, can split and still contrive to thrive. Thus the units of the future may be smaller, integral entities. Smaller units generally mean greater overhead, but the integral establishment can sometimes be economical in manpower compared with the symmetrical geometrical type which often is internally inflexible.

Another principle which is increasingly invoked in nuclear warfare is that of spreading the risk, particularly that affecting vitally important installations and services. This entails extensive stockpiling; multiplication of stocks, accommodation, handling personnel, transport agencies, and ports of entry. This must, therefore, greatly increase the manpower of the administrative tail. It can be offset by more mechanical handling and better

communications, but the over-all effect is inescapable, even though it may be mitigated. Thus the most advantageous effects may be gained by using air transport, but air transport cannot attempt to move the same tonnages as sea or rail transport, and so additional restrictions are placed on the material available and on the size of the "tail."

If global nuclear warfare supervenes, it may be that a type of guerrilla administration will be forced upon us. This will be a system of local self-sufficiency, dependent upon dispersed centers of support, using local agriculture and industry to the best advantage, thus permitting the continued prosecution of war despite the initial destruction of major arsenals and centers of population. In such circumstances much of the overhead will have to be raised on the spot to ensure a continuing war effort and survival into victory.

Specialists

The effects of technocracy are more clearly illustrated in the air forces where 20 technocrats may minister to each winged gladiator. The army still expects an infantryman to master some eight weapons efficiently as well as operate a radio set. Generally, the army becomes an increasingly specialized service composed of hundreds of skilled tasks each taking from two weeks to two years to master. The services are equally as specialized as the arms, but this does not prevent them from learning to defend themselves when need arises.

The problems of reinforcing and training these specialists add considerably to administrative manpower strengths and to the "tail." This commitment is inevitable and must be accepted. Since our specialists increase our striking power, they must be tolerated, even encouraged. If the "tail" is not to become a greater liability, they must be well-trained soldiers, not civilian craftsmen in uniform. This stricture

applies equally to jungle and nuclear warfare; otherwise there is little scope for "tail" cutting among the specialists.

Delusions of Grandeur

Soldiers, like lawyers, thrive on precedent. Administrative planning is a matter of intelligent appreciation based on solid factors, precedent, and guesswork. Naturally, there is a great range of circumstances between the relative administrative simplicity of continental warfare and the complexities of desert and jungle. Hence the range of the gross divisional slice in World War II extended from 30,000 to 120,000.

Some of the accretion of manpower in the communications zone in modern war is attributable to the unwillingness of planners to take any chances. The introduction of the statistical method into planning has substituted formulae for commonsense logical deduction. So bemused have we become at the hands of the planners that only recently one witnessed such experts hoodwinking experienced soldiers (who had campaigned on four, eight, 12, and 25 pounds per man per day) with stories of how essential it was to back a force with practically hundreds of pounds per man per day. Such hyperbole verges on fantasy. It is undoubtedly responsible for some of the misunderstanding of the size and scope of the "tail" which is now current. What we need is an administrative Ardant du Picq to analyze the logistical facts of life and explode such theories.

Passive Acceptance

This age in which we are living has been characterized by certain modern moralists as the Age of Waste, Excess, and Gluttony. There is some justification in this accusation against western civilization, judged by the standards of the past, and indeed of the present in Asia. It is, therefore, a short step to accept-

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ance of administrative extravagance as a necessary evil.

It is clear that such administrative overhead in military operations springs from natural civilian habits of thought. Thus if the soldier gets apple pie and ice cream at home, the army regards the supply of apple pie and ice cream in the field as a routine necessity. Although such effort may represent a remarkable administrative tour de force, whatever mental comfort they may bring, these luxuries are not essential to the nutrition and fighting efficiency of the soldier. The Mahrattas defeated the Moguls because they, unlike their opponents, left their harems at home.

Attention has been drawn in the past to the destructive effects of war upon military assets as well as upon the civil economy. Reduction of military stock in trade will reduce battlefield wastage proportionately. The difficulty is to shake off habitual mental attitudes and to strike the first blow for reform. Of course, one shortcut to diminishing the "tail" is to reduce the number of "teeth" and the appetites of the attendant "stomachs." However, the main attack necessarily must be upon unjustifiable excess in the services of supply, movement, and domestic welfare.

Radical Approaches

There is an ultimate hope that the complexity of modern logistics will be rationalized by two radical measures. The first is the maximum standardization of all common-user material and employment between the three services, and in some cases civilian industry. There are preliminary steps being taken in this direction. The second is the unification of the machinery of logistics which the author has advocated over the past three years. This will cut the "tail" appreciably in the overseas theater, and, despite the present improvements of the single manager system (United States) and the agency system (United Kingdom and British Commonwealth), full unification will slash the / rial, and reserves.

overlap which now exists in administrative processes and lead to greater efficiency, with economy.

The Immediate Prospect

It must be accepted that every fighting soldier and every administrative soldier deployed in a theater of war will continue to require logistical backing of the present order, with incremental effects similar to those already discussed. Some comfort may be drawn from the decreases in supporting arms and their ammunition which will follow the adoption of tactical nuclear weapons.

An additional favorable factor lies in the ability of smaller formations with increased firepower to hold greater frontages and areas. Thus by diminishing the primary consumers their attendant services may be reduced.

Furthermore, the greater use of air transport, including helicopters and light fixed-wing aircraft, can eliminate much road transport and the related engineer effort. Such air transport can give great flexibility to centralized stocks of material.

On the debit side we must expect increased stockpiling, decentralized stockholding in order to spread the risk, with consequently greater manpower and movement overhead. Once operations begin we must expect heavier losses in stocks, accommodation, and major utilities such as ports and power facilities. This indicates little possibility of economy in certain types of base and line of communications units for the holding and handling of stocks.

Although the basic factors affecting the size of the "tail" appear to be of such a strategic and tactical order as defy the wishful thinking of the tail-dockers, there are subsidiary fields in which appreciable improvements can be made. The most obvious measure is the careful streamlining of staffs, establishments, scales of material and reserves.

Overinsurance must be combated by direct intervention of commanders over their logistical advisors. Mechanical handling equipment should be used to the maximum effect in all depots and transport areas. Modern packaging processes can be adopted to increase the storage life, and decrease the building space required for materials. Specialization should not be allowed to prevent the maximum interchangeability of personnel.

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By a high standard of basic combatant training the "tail" can develop a sting which will be needed in areas where vertical envelopment or guerrilla warfare threatens the rear areas. This releases infantry and armored units from rear area duty, and leads an over-all decrease in the size of force required for a given task.

A Spartan simplicity in standards of personal welfare is not excluded, but if it is to be attained without prejudice to morale and efficiency, it needs gradual training, with accompanying indoctrina-

tion appealing to sound soldierly ideals. The mathematics of such economies are such as equating the weight and morale value of bottled beer against the weight and morale value of troops' mail or newspapers.

Summary

The logistic increments of administration in the field cannot be eliminated, but they can be reduced and limited. In shortterm prospects only minor economies appear feasible because the dominant factors defy reduction. Ultimately, there should be considerable reduction of the "tail" as new weapons and new logistical instruments are brought into use.

But these considerations should not deter the reformers, since every legitimate economy in overhead must lead to a corresponding increase in hitting-power mobility and general warworthiness. And that, it is submitted, is a very real advantage to a nation of nine million people living in a strategic area populated by 900 millions.

Under the Mushroom

Digested by the MILITARY REVIEW from a copyrighted article by Captain D. J. Goodspeed in the "Canadian Army Journal" April 1957.

For obvious reasons the technique of conducting a successful *Putsch* is not one of the studies commonly found on the curricula of staff colleges. Authority is understandably sensitive on the subject of subversion, and in nations less happy in their internal politics than our own, too close a perusal of the tactics of the *coup* d'état might conceivably be looked upon with suspicion.

In nations where serious political violence has never appeared as more than a remote possibility, the subject has been somewhat neglected because there have always been more pressing and practical matters to occupy the time of the military student. In democratic states the distasteful nature of any employment of the military in defense of the civil power has perhaps caused even the defensive aspects of the question to receive rather less possible application than the modern trends require. Yet ever since the *Enola Gay* dropped the first atom bomb on Hiroshima there has been a search for alternative ways of waging war. We are all living under the mushroom of that terrible cloud, and ancient techniques, like that of the coup d'état, are being reexamined for their possible application to the modern world.

Until recent years the coup d'état was looked upon simply as an evidence of weakness and was considered indigenous only to the Balkans and to the minor prin-

cipalities of South and Central America
—far away countries about which the civilized world knew very little.

The Coup in History

Napoleon and his accomplishment of the 18th Brumaire (9 November 1799), of course, admittedly was something of an exception to this generalization, but then the coup which made him First Consul had been preceded by even more dramatic events, and Napoleon in any case was sui generis. At least until 1918 the violent overthrow of a government by a small coterie within the state was regarded as the prerogative of the various Ruritanias east of the Danube, and until an even later date the method itself generally was considered to have more in common with light opera than with any military doctrine.

All this was changed by the thunderous downfall of dynasties which occurred toward the close of the First World War. With the collapse of the three great empires of continental Europe, instability in government and a declining reverence for authority popularized the Putsch in areas where it previously would have been inconceivable. Hohenzollern and Hapsburg in the course of their long histories had indeed lost wars and been shaken by revolt, but never before had Berlin and Vienna been threatened by the intrigues of Zenda. In the interregnum between the two World Wars, however, Kapp, Ludendorff, and Seyss-Inquart each followed, according to his lesser abilities, the example which had been set by Lenin and Trotsky in their successful attack against the Kerenski regime.

Apart from the example of Lenin's success, another factor also influenced the extremist politicians of Europe. The logic of events slowly began to compel a reexamination of the theoretical basis of war. In all except the keenest minds it is probable that this reexamination was initially a shift in mood rather than a definite change in doctrine. Yet as war became

more terrible and more uncertain, it, therefore, became patently less satisfactory as the classic "continuation of policy by other means" which Clausewitz believed it to be. Lenin had read Clausewitz with care and admiration, but Lenin was not the man to bow any unnecessary knee to Baal. He accepted from Vom Krieg what seemed to him to be good, and unhesitatingly rejected the remainder.

All through the 19th century there had appeared nothing in military experience to deny the dictum of Clausewitz and no portent had been vouchsafed to cast doubt upon the absolute nature of the truth which he had enunciated.

After the French victories at Magenta and Solferino, Austria paid her forfeits in the classic style, and the new Kingdom of Italy had emerged. On three subsequent occasions Prussia put into successful practice the teachings of her military philosopher, and in the Danish Duchies, at Sadowa, and at Sedan proved again that war could be a profitable policy.

Even in August 1914 there was still a general belief that a European war could be fought and decided in one campaigning season. A spirit of high adventure was in the air that summer and young men, flocking to the colors, were fearful lest the fighting should be over before they could play a part in it. In the first few weeks of that war cavalry still charged with glittering lances, and for a short time it did indeed appear as though honor had come back like a king to earth. The bugles which blew out over the rich dead sounded no presentiment of the butchery which was soon to occur at Artois, Verdun, the Somme, and Passchendaele.

The long years of positional warfare, filled with futile attacks and enormous losses, could not fail to influence in some way all those who considered the problems of statescraft. World War I, which was begun with so much lighthearted élan, ended in a mood of bitter disillusionment.

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The lessons of history, however, never seem to be assimilated rapidly, and although both the left and the right were willing to adopt the *Putsch* as an additional instrument of foreign policy, they were by no means prepared to forego older and more direct methods. In 1939 the rulers of a great state could still believe that they might best achieve their aims by conventional force of arms.

The experience of the Second World War, with its ruin of cities and its millions of dead, reinforced the conclusions which were tentatively drawn from the first holocaust, while the bomb which was dropped at Hiroshima lent weight to the view that war might more properly be regarded as the bankruptcy of policy rather than merely as its continuation.

Yet it is to be doubted if any ruler or any government in any period of history has ever regarded war as an end in itself. Alexander's weeping that there were no more worlds to conquer is hard to reconcile with the fact of his return from India, for whatever may have been the cause of those kingly tears it is scarcely plausible to attribute them to an ignorance of geography.

Psychopathic philosophers like Nietzsche may have proclaimed that "a good war justifies any cause," but mankind has commonly been too astute to make its philosophers kings. And although there undoubtedly was much landesknecht philosophy among the Nazis and much voluble scorn for a bürgerlich way of life, it is certain that Hitler preferred the flowerstrewn streets of Vienna at the time of the Anschluss, or the Blumenkorsos of the successive occupations of Czechoslovakia, to the winter "hedgehogs" outside of Moscow or to the steel trap of Stalingrad.

No, the end of policy is power, and the rulers of states are likely to search for new means of achieving this aim before they are converted to a renunciation of force. For this reason it appears probable that the technique of the *Putsch* will have an increasing appeal in the years to come.

Alternative to War

The search for some feasible alternative to war is, of course, not new. In a sense it has always been the business of all diplomacy and, even in the realm of direct power politics, there have been numerous examples of more subtle methods than military attack. The statesmen of our age are, therefore, not the first to seek some cheaper and less hazardous means of gaining their ends. What is different is that the problem now is presented in a much more acute form than ever before.

At first glance it does not appear that the present level of armaments throughout the world lends any support to the view that war is about to be abandoned as the ultimate arbiter. Yet behind all the façades of military power there is today to be detected an entirely new reluctance to unleash such violence. The very magnitude of available military force now militates against its ready employment.

In the middle of the 20th century there is little danger that any major power will fight merely because its amour-propre has been offended. In the nuclear age more than the murder of an unpopular archduke will be required to unslip the dogs of war. None of these arguments, however, applies against an internal upheaval which is judiciously aided or inspired by a foreign power.

From this it might appear that coups may be divided conveniently into two categories—those which are purely internal affairs and those which are subsidized by a foreign power. This distinction, however, is not in practice as clear-cut as might be supposed, for even the *Putsch* which is achieved entirely as the result of national efforts invariably has some international implications, at least to the extent that certain foreign governments will prefer one type of regime to another.

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If it is true that no man is an island unto himself, but that each is a part of the continent and of the main, it is a fortiori, truer still that all states are situated similarly. Any bell which tolls for any nation is heard throughout the world. Thus it probably would be more accurate to say that the amount of foreign influence may vary all the way down the scale from an actual threat of armed intervention to a merely benevolent neutrality.

The Aim

The aim of any Putsch is the sudden and violent overthrow of the existing regime and the substitution of a new one. The basic philosophy is that it is easier to strike directly at the heart of government rather than to hack away to this vital organ through the normal defenses.

The entire concept of the Putsch insists that the clash of armies is to be avoided and that those whose function it is to defend the government are to assist in its downfall. From this it may be seen that, if any significant portion of the armed services remains loyal to the regime, or if the government has at its command any considerable number of armed irregulars, the Putsch is destined either to fail completely or to deteriorate into a civil war.

If, however, there is little or no opposition from any armed body within the state, and if there is some support for the new regime throughout the country, the forces required to conduct a *Putsch* need not be very great.

According to Stalin, who should have known, revolutions are made by militant minorities. Palace revolutions sometimes can be made by exceedingly small minorities. The *Putsch*, then, is distinguished from the civil war by the speed of its conclusion and the directness of its attack; it is distinguished from the revolution in that it is carried out by a relatively small number of insurgents rather than by a spontaneous uprising of the masses. The

civil war is bloodier than the Putsch; the revolution is more amorphous.

In military phraseology the successful coup d'état may be divided into three component phases: conspiracy, attack, and consolidation. The conspiracy phase may be said to begin with the first tentative plotting against the existing regime and to end with the first act of organized violence; the attack phase is concluded with the effective neutralization of the power of the government; and the consolidation phase is completed when that power, or a substantial portion of it, has passed into the hands of the insurgents.

General Rules

The Conspirators' Vade Mecum is one of the textbooks which has never been written because it is impossible to do so. So much depends on personalities, the local situation, the degree of acceptable risk, and on purely temporary and unique factors that only a few general rules are possible.

The first of these is that knowledge of the plot must be strictly limited, especially in the initial stages, to those who are absolutely essential to the plot's fruition. No one who is involved should be told anything more than he needs to know to conduct his own part of the operation. Some internal security apparatus must be organized to monitor the conspirators, and any treason to the cause which is even suspected must be dealt with ruthlessly and at once.

The obvious desirability of penetrating the government's intelligence service at as high a level as possible probably is the last of such general obiter dicta which can be given. Conspiracy, like the art of making love, is too individual a recreation to be susceptible of profitable analysis. Each man must do the best he can.

In the attack phase, unless everything else is overwhelmingly in favor of the rebels, it is essential that the major personalities of the existing government be prevented from escaping and providing a rallying point for the defense. The two ways in which this neutralization may be accomplished are assassination or capture. If other means were feasible, a more civilized procedure could be adopted for changing governments.

Two Methods

Of the two methods, assassination generally is the easier to achieve, for no matter how well-guarded a statesman may be, he invariably is vulnerable on his unavoidable public appearances. The shades of Lincoln and of the Archduke Ferdinand, of Barthou and King Alexander of Yugoslavia, of Dr. Dollfuss and of Gandhi offer mute testimony of the inadequacy of any protective measures.

No guards along the route, no searching of houses or patrolling of rooftops, no previous roundup of suspects can ensure the safety of a public man in public. The most which can be guaranteed by even the best security force is that the assassin will not escape, and in the past this has never proved a deterrent to ardent patriots, political fanatics, or drug-crazed criminals.

Experience would indicate that the pistol or the bomb is the most reliable weapon for an assassin, with the preference going to the pistol. Gavrilo Princip, after all, managed to start the First World War with his pistol shot in Sarajevo in 1914, while the bomb which was first thrown at the archduke did little more than enrage him, and Hitler unfortunately survived the explosion in his East Prussian head-quarters in July 1944.

The bomb certainly is no easier to conceal about the person than the pistol and it is much less reliable. Even when a bomb is equipped with a timing device, it cannot really be claimed that this allows the assassin to escape. Von Stauffenberg, if he could have used a bullet in Hitler's bunker, might well have died, but he probably would have died less pain-

fully than he did, and he might, with a bullet, have changed the course of history. With so small a fulcrum it sometimes is possible to move the world.

The capture of government leaders may be somewhat more difficult to accomplish than their assassination, but the method, nevertheless, has its advantages. Probably the most important of these is that it eliminates the moral stigma which, even in this century, is commonly attached to murder. The conspirators in the early days of their plot usually will find it easier to convince those whose help they need to join in a coup if no blood is to be spilled. There are a surprising number of people who cling to the belief that omelets can be made without breaking eggs. This is a hard dilemma for the leaders of a Putsch, since it necessarily increases the difficulties of planning without in any way diminishing the risks. Yet it often is unavoidable, for in a world which is divided into the hardhearted kind and the softhearted cruel, the latter greatly outnumber the former.

A further possible advantage of capture in preference to assassination is the ability it confers upon the rebels of staging a public trial after the *Putsch* and thus of justifying their action by the appearance of legality.

History often has heard repeated the pathetic boast of the Puritans after the execution of King Charles—"This thing was not done in a corner." Obviously, however, the public trial is a double-edge and dangerous weapon. In the first place, the accused must necessarily be convicted since an acquittal would amount to a condemnation of the coup. The Nazis, who blundered in so many greater matters, also miscalculated badly when they tried Dimitrov for the burning of the Reichstag and it is possible that the world may not yet have heard the last of Nürnberg.

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a travesty of justice, is hardly calculated to promote good public relations. There have been several defendants of whom it could be said that nothing in their lives became them like the leaving of it, and the new regime which publicly tries the members of the old government runs the risks of estranging its supporters over so inconsequential a matter as the bearing of a condemned man.

Military Objectives

Apart from the neutralization of the leaders of the existing government, it is difficult to define for all cases precise military objectives for a Putsch, since these must vary necessarily in each instance with the political situation, the disposition of armed bodies within the state, and the likelihood of foreign intervention. In many coups there has been a tendency indiscriminately to occupy government buildings in the capital. This habit in itself can contribute much to the failure of a Putsch, for not only does it disperse the attacking forces, often needlessly, but it also tends to bring the entire operation of the state machinery to a halt.

Certain buildings must always be occupied, but each of these must be decided on its own merits. The attacking forces must resist any temptation to march into post offices, railway stations, and hydroplants merely because they seem to have no place else to go. Any arsenals not already in the hands of the rebels must, of course, be seized immediately, but this should not be done with the intention of obtaining arms. So many delays and unforeseen difficulties may arise even in such a relatively simple operation as the capture of an ordnance depot that the attackers cannot afford to rely on such sources for their weapons.

This, needless to say, is a counsel of perfection, an attribute of that perfect or absolute *Putsch* which is doubtless laid up, like the Platonic ideas, in heaven. In the world of reality Captain Murat gal-

lops desperately through the dark to seize the guns in the suburb of Sablons, and yet the coup succeeds.

Ideally speaking, however, the aim of the occupation of arsenals should be to prevent the distribution of weapons to possible government supporters or to the mob.

Once the "putschists" have neutralized the old regime effectively, they must aim at the speedy restoration of law and order, the elimination of looting, and the suppression of those private murders which always are likely to accompany widespread disorder. Concurrently with this, the new government must ensure that any latent hostility does not flare up into counterrevolution. Public opinion, therefore, must be controlled for some considerable time, and any dangerous supporters of the old order must be arrested.

A successful Putsch also may bring about a crisis in foreign relations, and this must be dealt with by new alliances, concessions, or by a show of force. Foreign governments, either because they dislike the new regime or because they believe they see their chance in the momentary weakness of a neighbor, may invade or threaten to do so. And revolutionary juntas are not always so fortunate as were the French at Valmy.

In spite of the deceits and the contrived unfaithfulness which must so often mark the consolidation phase of a coup d'état, it is, nevertheless, here that we can see the affair most clearly for what it is.

The Search for Truth

The conspiratorial phase necessarily is of the shadows, and not even the prying torchlight beam of history later will be able to illuminate all its darker corners. The attack phase usually is open for all to see, but it tells us little. What fingers pulled the triggers, which way the fighting went, what was the count in dead and wounded—these things are the commonplace measurements of battles. If the fight-

ing favors the government and the coup is suppressed, there are likely to be confessions in the modern manner. If the fighting favors the rebels and the coup succeeds, the world will be the richer for memoirs.

Neither the forced recantations of the vanquished nor the retrospective justifications of the victors are likely to assist greatly in the search for the truth. Yet by the way in which the new government deals with the country it has taken over we may generally judge its motives and its aims. By their fruits we are able to know them.

What the outside world sees during the consolidation phase of a new regime frequently is unpleasant enough. Certainly any government which comes to power by assassination, by secret violence, and by false propaganda must feel a strong compulsion to adopt sternly repressive measures. There are certain to be at least some sections of the nation which preferred the former state of affairs. Thus there is always the dread of counterrevolution, the fear that what has been so wrought may be unwrought by the same method. In addition, there may be threatening foreign powers to be appeased by concessions or opposed by force.

With all this against them, the wonder is not, perhaps, so much that many governments established by the coup d'état turn out badly, as that some of them have upon occasion turned out well. It should come as no shock to the historian to discover the fatal facility with which evil means so often corrupt good ends.

Instrument of Policy

What is more surprising is that it does not always happen, that occasionally out of conspiracy, murder, and violence there does indeed issue justice, freedom, and the dignity of man.

In any case, whether we like it or not the Putsch as an instrument of policy is already with us. Neither a knowledge of history nor a study of the human heart can encourage the hope that men will forsake their search for power through force, but the ever-increasing destructiveness and uncertainty of war eventually must ensure that other forms of violence will be substituted for it. This lesson, which seems so plain to read, may not, of course, have been learned as yet.

Perhaps the world will not be convinced until it has actually tried a hydrogen war, for the world is remarkably willful—a characteristic which it traditionally shares with its confreres, the flesh and the devil. But in the end intelligence is likely to prevail—although morality may not—and the concentrated blow at the heart of government will be preferred to the brutish and meaningless slaughter of millions.

The technique will, no doubt, be refined upon and improved. There are signs of this already. Especially in the oligarchic camp there has been a tendency of late to favor what might be called the constitutional *Putsch* which consists essentially in eliminating the attack phase of the operation and transferring the violence from the public square to the people's courts.

Under this system, before you kill your enemy, you first of all accept cabinet posts in his government. It is undoubtedly natural that would-be tyrants should act in this manner, for tyranny springs from cowardice and there always is the danger that the fighting at the barricades might go against them.

On the other hand, the democratic faction which revolts against an already established autocracy never has the opportunity to achieve its ends in this way. Although it may be quite as bloodthirsty once it gains power, it must by the very nature of things rely upon honest fighting to bring about the downfall of its foes. Oligarchies always walk hand in hand with fear and have an almost pathological preoccupation with matters of self-preser-

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vation. They rely for their protection upon the Gestapo or the Ogpu, upon the knock on the door at night, the waiting van, the trip to Buchenwald or to the Lubianka. Where there is no constitution there can be no constitutional conspiracy.

In spite of this it remains true that democracies are inherently less vulnerable to the *Putsch* than are tyrannies. Although dictatorships probably enjoy many purely military advantages—at least until the actual outbreak of war—the entire structure of autocracy is, nevertheless, more susceptible to internal subversion than is that of representative government.

Just as it is to the normal military advantage of dictatorships that their executive power is highly concentrated, thus making possible sudden decision and swift action, so also this very concentration of power at the top necessarily presents a more attractive target. Policies which are imposed from above may be changed by the violent deaths of the policymakers, but policies which have their origin in the will of the people and which achieve their expression by due democratic process are infinitely less dependent upon a few personalities.

A second factor, and one which ultimately may be of more importance, is that oppression is not a natural state of man. No doubt, there always will be dissident elements in democracies, but the curses which are directed at dictators, although they may not be so loud, are very deep.

The Question

There is some reason to hope that the technique of the *Putsch*, which has so far been employed mainly by the tyrants, may yet become the salvation of the people. Indeed, if we look at the pale pathetic millions in every part of the world who are suffering under one form of oppression or another, we may well ask ourselves: How else can liberation come?

In the western democracies there is a tendency today for even the soberest political forecasts to read rather too much like science fiction. It is not only that we appear to put our faith exclusively in chariots, but also that we completely ignore the tremendous potential of all those later forces which grow and are nourished by man's eternal desire for freedom.

Power in the future may, of course, belong to the civilization which progresses farthest and fastest with guided missiles, spaceships, and calculating machines. It may, on the other hand, be that the future is reserved for those who best understand the motivations and impulses of the human heart, the principles for which men will fight, and the ideals for which they will die.

If this is so, the decisive battles of the future may be won, not by the long-range bombardment of great cities or by the bloody offensives of huge armies, but by some heroic sacrifice of tyrannicide or by some sudden small assault across a public square.

The possibility of the small war is . . . one which we cannot overlook. As atomic capabilities approach parity, it is certainly a likely type of conflict. Should it break out, it must be dealt with quickly and effectively. Otherwise, it could result in the piecemeal erosion of the free world, or it could spread into the general war which we are trying so urgently to avoid.

Biological Weapons

Translated and digested by the MILITARY REVIEW from an article by Doctor Eberhard Krauss in "Truppenpraxis" (Germany) Nr. 3, 1957.

IN FORMER times some armies lost more men by disease and epidemics than in combat. In Napoleon's retreat from Russia, for example, his troops suffered greater losses from diseases than from the cold or the enemy. In World War I there were 150,000 people who died in Serbia from the spotted fever. Those epidemics often have played a militarily important or even decisive role. In recent wars a great deal of attention has been paid not only to the enemy but also to the omnipresent source of mass epidemics. Every German soldier stationed in the Russian theater will remember his periodical inoculations, and those stationed in the Mediterranean area will recall their daily atebrin pills. These and other preventive measures helped to reduce the danger of epidemic diseases to a minimum.

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The possibilities of the use of epidemics as a means of warfare against the enemy are not farfetched. One might transfer and introduce the disease artificially into the enemy's army and weaken his manpower considerably. With this thought, which actually occurred early in history, "germ warfare" was born. The aim was to hurt the enemy by the introduction of the disease directly into his body.

This objective could be attained only by employment of biological means, that is, means produced directly by nature (as opposed to the artificially complex explosives or combat gases created in laboratories). Today the term "biological warfare" includes a score of objectives. It is directed against human beings and also against animals and plants. The aim is either to destroy his food or to create a direct danger to him through animal epidemics.

There are several means of biological

warfare. Among these biological weapons are:

Microorganisms.—This group includes bacteria and virus already known in everyday life as sources of diseases. An example of bacteria is typhus. Examples of virus are the common cold, and foot and mouth disease.

Bacteria poisons or toxins.—Taken from cultures of bacteria are such poisons as the toxins of the botulinus, a bacteria responsible for meat poisoning. Its toxin belongs to the strongest known poisons.

Animals of higher order.—Insects are known as carriers of diseases (mosquitoes transferring malaria, for example). This group also includes rodents.

Fungi.—These cause plant diseases (particularly the fungi causing blight or smut).

In addition to those actual biological weapons, that is, weapons which have a biological source or basis, we may add certain others produced in laboratories such as the "plant poisons." These poisons may, if properly employed, destroy the crops of the enemy prematurely. (The antiweed chemicals offer a good example of the task range of these plant poisons.)

Certain qualities are necessary to make these biological weapons effective. The bacteria and virus have to be highly infectious, they must be able to stay alive for long periods of time under unfavorable conditions in combat areas, and they must be suitable for mass breeding. Toxins and plant poisons must be very effective in small or low concentrations. These are the factors and conditions that limit the great number of otherwise suitable organisms and substances to be employed in combat.

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It is obvious, on the other hand, that this facilitates the defense.

The employment of biological weapons may be carried out by plane. It is possible to release them in bacteriological bombs or as a spray. Both systems have their advantages and disadvantages. Employment in artillery shells is possible but not very probable. The introduction by sabotage, however, must be taken into serious consideration in a germ warfare. Here, it might be used very successfully to poison foods or water. Another probability is the introduction of animal epidemics by sabotage.

Defense

Defense is based upon the detection of the biological weapon itself or the detection of the employment. This poses great difficulties, however, since detection and identification of the employed germs is only possible under a microscope. The actual outbreak of a disease often will be the first sign of their presence. This will be only after days of the original employment, as there is a certain interval (incubation time) between the infection and the appearance of the disease. In order to avoid any further loss of precious time, it will be necessary, therefore, to report immediately and under all circumstances the outbreak of any infectious or unknown disease. Only then can tests begin in special laboratories built for the detection of such war agents. These tests may prove or disprove suspicion of employment of biological means of warfare, since the possibility exists that the disease may be a natural infection.

Naturally, there may be indications of employment of biological weapons even before the actual outbreak of the disease. If the airdrop of bacteriological bombs or the spraying of fog or liquids from planes has been observed, employment of biological weapons must be suspected. Other indications are humid spots in otherwise dry areas (this also may be caused by a ground

contaminating agent), or the abnormal discoloration or withering of plants.

A rise in the number of sick and dying animals is an alarming sign. The fact must not be overlooked that some dangerous animal diseases also may be dangerous to man (for example, hoof and mouth disease). The poisoning of wells is difficult to detect by human senses, but poisoned food may be discovered more easily since it often spoils in the presence of disease-carrying organisms.

In all cases where there is suspicion of a biological attack it will be advisable to collect samples (earth, water, food) for immediate analysis in competent laboratories. This will be essentially the task of the biological defense personnel of the company, but every soldier should have a basic knowledge of these matters.

Preventives

The defense depends upon the biological weapon employed. It is mainly a responsibility of the army medical service so far as the soldiers are concerned. By preventive measures, however, the troops can make the success of a germ warfare attack unlikely. Above all, personal hygiene is important.

Strict cleanliness of body, clothing, and living quarters, even under combat conditions, will reduce the danger of infection to a minimum. Cleanliness always is desirable, but under biological warfare conditions every soldier must become a "fanatic of cleanliness." Water and soap will be the best weapons of the individual against this enemy. Good health is of great value. A healthy, strong organism easily withstands an infection that would overcome a weak man in short time. Every soldier has to take advantage of every means and chance to keep himself fit.

Sources of infection such as sick or dead animals must be removed immediately. Caution must be observed in the care of food or drink. Only food and drink from closed containers are usable. In case such containers are not available, food should be cooked at least 10 minutes, or longer if possible. The simple broiling of meat is insufficient, as some germs are very heat resistant.

No one can say today how far plans for this type of operation have gone, or specifically what might be employed in biological warfare. It is known that all great powers conduct constant research in this field. It is difficult to foresee how successful this type warfare will be, for we have no data available upon which to base a prediction. But the possibility and danger should not be underestimated.

On the other hand, most biological weapons will be known, not, perhaps, to the troops, but in any event known to science. Decades ago science started a constant and so far successful war against the same disease-causing organisms that might eventually be employed against man. Impressive proof of this success is the disappearance of almost all epidemics of past centuries. The biological and medical sciences have developed basic defenses that can be adapted to field conditions and are available to every soldier. This will doom any biological warfare to failure before it is even started.

Land Air Warfare--The Navy's Part

Digested by the MILITARY REVIEW from a copyrighted article by Commander C. B. Lamb in "Air Power" (Great Britain) July 1957.

"THE British Army," wrote the late Admiral of the Fleet, Lord Fisher, in his book, Memories, "should be a projectile fired by the Royal Navy." Although Lord Fisher was quoting Sir Edward Grey, who made that provocative statement when he was Foreign Secretary at the outbreak of World War I, it is doubtful that either of those gentlemen would subscribe to such a sweeping, oversimplification were they alive today.

It is a truism that the advent of the nuclear weapon has had such an overwhelming effect upon the whole world that, literally speaking, everything is overshadowed by it. No one will ever know what shape a future war will take—until it is upon us. To date, no war has ever followed an expected course or a predicted pattern, and there would seem to be less reason now, when so many new factors are involved, for any strategist to be able to say, with confidence, "this and that will happen."

Should there ever be another major con-

flict which is not ended decisively by the air battle, Lord Fisher's quotation of the statement by Viscount Grey might again have a ring of truth. Through a lack of natural defensive barriers and a desire for access to warm seas, Russian policy always has been one of expansionism. If a situation of stalemate existed after a nuclear exchange, it might be vital for the army to be able to prevent the Russians from overrunning Europe. How would the British Army get there to stop them? We would hope, surely, to take them by air. But would that be possible?

Air Transport

There is no doubt that NATO's air-lifting capabilities are enormous. It is a much greater and more efficient organization than any that has existed in the past. Assuming that the Royal Air Force's Transport Command in Europe and the United Kingdom, and all the other national forces in Europe capable of mustering powerful transport air forces (the United States,

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France, Belgium, Italy, and others) had survived the bombing in sufficient strength to work as an organized NATO airlift team under a single "theater commander," we probably could lift a division where it was most required within 24 hours. This spearhead could be backed up for quite a time with full logistical support supplied by air, while more and more troops were flown in. Then the navy's task would be concentrated on getting those supplies, and the necessary aviation fuel and oil, eastward across the Atlantic and into Europe.

The United Kingdom and Europe could only support the huge force that would be needed for such a land/air battle for a matter of days—at the best weeks. Obviously, the absolute maximum would be brought across the Atlantic by air, particularly in the opening phases. But for how long could this airlift be kept up? And the fuel, needed in Europe for return flights and for the day-to-day requirements of the tactical air forces operating in the forward areas, also must be provided.

The problem of the supply and demand of aviation fuel, which was one of General Douglas MacArthur's biggest headaches in the Pacific war, is still with us and has changed very little. At that time there was a vital need for the constant supply of 100,000 tons of supplies monthly. This vast quantity of goods and fuel was brought from the United States to Australia by sea, a distance of 5,500 miles, every month. A total of 44 Liberty ships was permanently employed, doing nothing else. Irked by their slowness General Mac-Arthur ordered an investigation into the possibility of bringing these supplies by air. This investigation revealed that 10,000 of the largest type of heavy-lift aircraft then in being would be requiredbacked, maintained, and manned by 120,-000 men. But to enable the aircraft to operate, a total of 89 ships was found to be absolutely essential merely to provide the aviation fuel for the aircraft along the route and in Australia.

The attempt to save shipping and to speed up supply by doing it by air resulted in a requirement for more than double the amount of shipping that was already coping with the logistical support of the forces.

While acknowledging our strength in NATO, we must face up to our weaknesses as well. The economic aspect cannot be ignored. Are we in danger of ignoring it? I think we are in danger of assessing a false sense of security.

Surface versus Air Transport

Recently, an authority on the subject of air transport announced that two Beverleys can do the work of one Liberty ship if they fly to and fro for the same length of time the ship would take on one pasage. This statement was made in relation to a journey from the Far East to England. Obviously it would not apply to short sea passages such as the English Channel.

It is certainly true that a Beverley is better in an ambulance role than a 10,000-ton hospital ship since it can carry 48 stretcher cases and 34 sitting casualties at once. As far as bringing supplies across the Atlantic is concerned, the longest leg—taking advantage of Iceland and Greenland—would be about 1,600 miles. This would give the Beverley a payload of seventons.

The 10,000-ton ship can carry 8,500 to 8,700 tons of cargo in one haul and, of course, the size and weight of the load is not affected by limitations of stowage. or range as it is with an aircraft. For example, the maximum payload of the Beverley is 45,000 pounds, but at that load is range would be only 100 miles. The size of its hold is 10 by 10 by 40 feet, so anything very big would have to be broken down and reassembled on arrival. The average cargo ship has five holds with two

5-ton derricks each, plus an additional "jumbo" derrick above its biggest hold that is capable of lifting 40 tons at each grab.

However, the news about the Beverley is heartening if supplies are needed at once and the increased cost of bringing them by air can be accepted. Beverleys cost \$126,000 each, plus the cost of the fuel and its transport—for the aircraft fuel would have to be brought across the Atlantic in additional tankers.

Capabilities

Providing we face the fact that air transport is not enough on its own and in no way has superseded the need for shipping, our worldwide air-and-sea transport capabilities are enormous. Used in conjunction with one another, they constitute the greatest single factor, apart from the H-bomb, likely to deter the Russians from ever engaging in a global war with the West. Twice in one generation Russia has seen the apparently all-powerful Germany brought to defeat by this ability to bring the might of America across the Atlantic, and she must realize that such a war would be fatal to her in the long run.

There is also the problem of the support of our civilian populations in the United Kingdom and Europe. In the United Kingdom we import 40 percent of our foodstuffs—to live. The year before last we imported about 84 million tons of material by sea. We imported 25 million tons of oil just to keep the wheels of industry turning. That figure was exceeded last year [1956] and in eight to 10 years it is likely to be doubled.

All this clearly and irrevocably shows that in a global war the navy will be engaged heavily in its age-old task of protecting our sea communications. These communications are, as they always have been in history, our veritable lifelines. Since Russia is not dependent upon seaborne supplies we cannot win the war by

denying her the use of the seas but—we can lose the war very quickly indeed if we lose control of the seas.

That Russia recognizes this is borne out by the immense size of her own navy, and the fact that she has built the biggest submarine fleet in history. In World War II the Germans started with only 60 submarines; it took them two years to work up to peak efficiency, yet they came quite close to winning the battle of the Atlantic. The Russians already have more than 500 and are turning out oceangoing submarines at the rate of 70 a year.

In the past this task, greater than ever before and against bigger odds, has been confined to "ensuring the safe and timely arrival of our convoys." In the future, presumably with a country devastated by nuclear bombing, this will not be enough—it will be necessary for our sailors to get the supplies ashore where they are needed and where they can be distributed. Imagination boggles at the magnitude of the task in the face of the threat from enemy surface, submarine, and air forces—all equipped with nuclear weapons, and all capable of full-scale mining.

Prevention of Global War

What part can the navy play in preventing war?

Since the first atomic explosions in 1945 which ended the war against Japan, a great number of nuclear tests have been made but no such weapon has been exploded in anger. Instead, there have been a series of comparatively brief outbreaks of hostility all over the world, all Communist-inspired, and all settled with conventional weapons. In the most outstanding of these—Korea, and more recently, Suez—the aircraft carrier has played a major role.

Most people would agree that global war is most likely to come as a result of limited wars getting out of hand. It has been said publicly by important and presumably responsible statesmen, that if the

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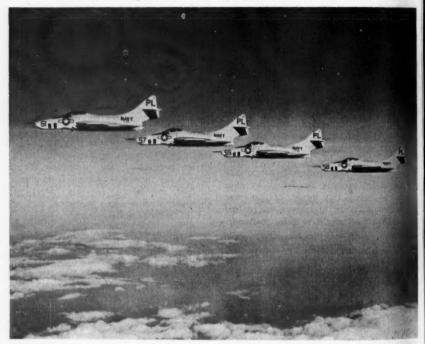
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Americas are brought into another Korean type war, tactical nuclear weapons will be used. Whether this would be substantiated I do not know, and am not in a position to know. However, it seems logical to suppose that once tactical nuclear weapons have been used the door would have been opened to use bigger and better bangs. We would be going through that door to tread a fearful path down the

evil in any other way, we must be in a position to prevent an enemy from using this ultimate weapon of mass destruction by containing and winning, with the utmost speed and efficiency, any Communist. inspired outbreak of hostility.

Carrierborne Aircraft

Since the pushbutton era has not reached perfection, seaborne aircraft will be ex-



Official US Navy Photograph

Carrier-based aircraft, such as the United States Navy's F9F-8 Cougar, will be most effective in the vital opening phases of a war

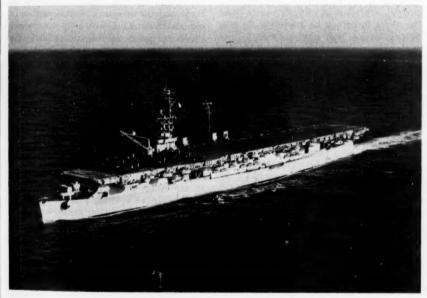
slippery slope which leads to the use of thermonuclear weapons and the destruction of civilization as we know it.

That the thermonuclear weapons must never be used by anyone, surely no thinking man or woman would contradict. Because we cannot counteract the forces of

tremely important in waging the land/air battle until airfields can be established and land-based aircraft take over. This becomes more and more evident as time passes. The difficulty of setting up these short bases quickly is always with us and gets more acute as the world situstion changes and overseas bases become less and less certain of being available.

In the vital opening phase of a limited or police action war it may be essential to be able to launch an attack from areas where shore bases are unobtainable. The modern airplane needs a couple of thousand yards of carefully laid concrete and commodity which is "in the shortest supply." The carrier force, being mobile, fast, and self-contained, and which can move about the world without being beholden to the political whims of any landlord, is the obvious answer.

In limited or police action wars, the entire navy's mobile force can be concen-



French Embassy Press and Information Division Photo Aircraft carriers reduce the need for costly airfield construction. Pictured is the French light fleet carrier La Fayette

many complicated technical aids before it can operate.

There are many parts of the world, particularly in the Far Eastern theater, where this problem of airfield construction and the additional headache of providing the full logistical support which such a foreign base would need, would have to be met before the land-based aircraft could take part efficiently and economically. All this takes time, and "time," in the opening phase of a modern conflict, is the

trated on the task of supporting the land/-air battle. Only in global war is there a serious threat to our sea communications.

The Carrier's Role

Naval forces may provide any or all of the following in support of tactical air operations:

- 1. Aircraft for tactical air operations of almost any kind.
 - 2. Antiaircraft defense.
- Seaborne "control and reporting centers."

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- 4. Electronic countermeasures.
- 5. Air-sea rescue by aircraft, surface vessels, and by submarines.
 - 6. Weather reporting centers.
 - 7. Evacuation of wounded by helicopter.
 - 8. Navigational assistance to aircraft.
 - 9. Reconnaissance.

The provision of Royal Marine amphibious assault forces also can be a most important contribution. At the same time the naval force will be providing its own fighter defense and fighter cover for its strikes, as well as being responsible for its own surface and antisubmarine patrols. When operating within the area of responsibility of the tactical air force commander the naval aircraft come under his control; outside this area, they are controlled by their own parent organization.

Exchange of Information

Before effective tactical air operations can be undertaken the naval force commander must know all there is to be known about the targets ashore. Apart from his own reconnaissance effort, which must be precise and effective, there is a minimum exchange of information that must take place between the commander of the force afloat, and, if there is one, the tactical air force ashore.

At sea, the commander must know the air and ground situation ashore, the air and naval threat to his own force, the local identification, defense, routing, search and rescue, and kindred other operational procedures in use. In turn he will pass to the Joint Operations Center (JOC)—which may be afloat at the beginning of the operation—the number and capabilities of carrierborne aircraft available and the duration of the support they can give, as well as any carrier operating procedures affecting aircraft in the area. A common knowledge and practice in the

use of each other's communication systems is very important.

All requests for naval support from the shore are forwarded to the force commander through the JOC. These requests might vary, for example, from requests for naval gunfire for support of the army ashore to requests for an immediate strike by naval aircraft. The effectiveness of these and the efficiency of this method of communication between ship and shore was borne out in the Suez operation by the signal received by the naval force commander from the army commander afterward. This read:

To all supporting aircraft. Many thanks for your magnificent support to us this day which thrilled all ranks. Its timely effectiveness and accuracy were beyond praise and doubtless saved many casuaties. . . .

Working in conjunction with the forces ashore in this way (or perhaps even going it alone in the opening phases of any future conflict before land forces have been able to get there) carriers have been able to provide, and should be able to continue to provide, one of the most effective methods of support for the land/air battle yet evolved since World War II. Never again must they be allowed to be equipped with aircraft which compare unfavorably with the enemy's.

It is to be hoped that their effectiveness, as one of the best known methods of preventing global war by being able to win limited wars quickly, will continue to be as successful in the future as they have been in the past. For the first nation to emerge from the ashes of a future global conflict may perhaps be able to call itself the victor—but will victory have been worthwhile?

Britain's New Pattern of Defense

Digested by the MILITARY REVIEW from an article by Cyril Falls in the "Australian Army Journal" September 1957.

THE AIM: To make war, as far as may be, impossible

THE MEANS: Modern forces, suited to the modern world

"Forces to be Reduced to 375,000 in Five Years" states a newspaper headline. The extent of the cuts in Britain's defense, especially in manpower, has attracted more attention than the theories behind them. Here an effort will be made to redress the balance. First of all, however, it will be convenient to set out in the briefest form what the reductions amount to.

In manpower the aim is to reduce the combined strength of the three services of sea, land, and air from 690,000 to 375,000. The navy's material cuts are chiefly in ships of the reserve, considered obsolete. Little has been announced about those of the army, except numerically, in which respect it is to be approximately halved. What abolition of units this will involve is unknown, but it is certain that the sharpest reductions will be in depot and workshop troops. In the Royal Air Force, the Second Tactical Air Force on the Continent and the light bomber force at home, which is assigned to the North Atlantic Treaty Organization, will both be halved. Fighter Command, another home force, will be reduced in strength and confined to the defense of bomber airfields.

End of Conscription

Let us glance at the redistribution of the forces that will remain. The new structure of the navy will be based on a small number of carrier groups, one of which normally will be stationed in the Indian Ocean.

The reduced army will increase its hitting power with tactical atomic weapons. The central reserve in Britain will be kept in the highest possible state of mobility by means of the development of the transport aircraft fleet in the Royal Air Force Transport Command and contracts with private firms.

In the Royal Air Force the medium bombers will be supplemented by ballistic rockets. The fighter force for the defense of bomber airfields eventually will be replaced by guided missiles. Some squadrons of the Second Tactical Air Force in Europe will be supplied with atom bombs.

The means of reducing the manpower of the services will be the gradual reduction in numbers called up under conscription. The final callup under the National Service Acts is expected to take place at the end of 1960, so that by the end of 1962 it is hoped that the total strength of 375,000 will be "regulars" or voluntary professionals. Needless to say, this is an aspiration because one cannot get volunteers unless they volunteer.

Secondary Wars

Now for explaining the theory behind the cuts promised above, it being understood that I am discussing the official principles with which I agree. The danger represented by nuclear weapons has become so overwhelming that the probable role of conventional forces has decreased still further in the last year or two. Their chief part is to stand ready for the waging of secondary wars. It is considered—and this view has historical backing—that there may be such wars simply because nuclear weapons are so terrible, and secondary wars might break out between nations which do not possess them.

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Thus the army has three major roles: continental defense within the frame of NATO, harder hitting although reduced in size; home defense, taking in some aspects of civil defense allotted to the Territorial Army; and reserve for the needs of Britain and the commitments of her alliances and pacts. Part of this is a small Commonweath Strategic Reserve and, in addition, forces in the Persian Gulf and East Africa.

The aircraft carrier is maintained in the navy as "a mobile air station," because expert opinion holds that it still has a significant role.

The Financial Aspect

Finance enters into the reductions as a whole because costs are rising fast and maintenance of present strength would involve gravely increased expenditure. It is this consideration which has convinced the government to abandon the project of building supersonic bombers.

The desirability of putting a proportion of the present large military manpower back into civil life, into industry and science, is also a factor. Financial savings will be much smaller than those in manpower, but it is hoped that they will be substantial.

In short, the aim is to produce modern forces suited to the modern world and at the same time relieve the strain on the national economy where possible. It resembles that of a business firm whose expenses have become disproportionate to its profits and which is determined—on the advice of its auditors—to reduce them, while maintaining efficiency as far as possible. It hopes to increase it in some respects, and in others to make any falling off there may be proportionately less than the savings.

The United Kingdom Government has not listened to the voices proclaiming that "nothing but the bomb matters and all else is waste."

The Nuclear Deterrent

Whether the provision made for "all else" is adequate can be proved only by experience, but at all events it has been recognized that some precautions outside the sphere of nuclear war are vital. It is no less clearly recognized that nuclear war is suicidal for any party which engages in it.

The nuclear deterrent must be maintained as the best hope of preventing another global war, however, its value lies not in its use as a weapon but as a sanction for the avoidance of war. In the broadest sense, the object of defense measures is to render war unlikely—as near as may be, impossible—and not in order to prepare to wage war.

MOVING?

If you are moving, please notify the MILITARY REVIEW, Fort Leavenworth, Kansas, of your change of address. Be sure to include your name, old address, and new address.

BOOKSOFINTEREST

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SOLDIERS AND GOVERNMENTS. Edited by Michael Howard. 192 Pages. Eyre & Spottiswoode, London, England. \$3.00.

BY LT COL HAROLD E. BEATY, CE

Soldiers and Governments is a well-balanced collection of nine studies in civil-military relations edited by Michael Howard, and based upon a series of lectures delivered at King's College, University of London, in the Michaelmas Term 1956, by distinguished British authors and lecturers. Here is discussed a question of considerable interest and importance: the relationship between military staffs and civil governments in recent history.

The historical studies include those en Great Britain, France, Germany, Russia, Japan, Spain, Latin America, and the United States. Each is brief, interestingly presented, and accurate in detail yet flavored with the opinion of the author. It is necessary for the reader to be familiar with important personages of the various countries because they are referred to without introductions or backgrounds. Since personalities are the controlling elements in any government, so it is with the military. It is interesting to note that military leaders have had powerful effects upon the governments throughout the ages including the present.

Students of military history will find this a valuable reference book. Although the studies are more or less colored by personal feelings of the authors, they do contain historical facts which would take a considerable time to research. JEB STUART. The Last Cavalier. By Burke Davis. 462 Pages. Rinehart & Co., Inc., New York. \$6.00.

BY LT COL MITCHEL GOLDENTHAL, CE

This is a gay but thorough biography of the dashing, spectacular cavalry leader of the Civil War—General James Ewell Brown Stuart. Burke Davis, the master of historical reporting, touchingly reveals the full inspirational magnitude of Jeb Stuart—the man and soldier.

The realistic portrait of Stuart includes the details of his boyhood, his cadet days at West Point, his early years as an officer in the West, and his famed Civil War exploits. A courageous, devoted soldier, Stuart was without parallel as a cavalry leader. From Jeb's part in the capture of John Brown at Harpers Ferry to Yellow Tavern the battle scenes come to life with sparkle and vivacity.

Stuart is delicately revealed as a gallant example of a Southern gentleman fighting and dying for his beliefs. The book is replete with photos, contemporary letters, dispatches, and postwar reminiscences of his comrades. Military readers will find this accurate biography of a foremost proponent of the mobile, fluid battle to be extremely rewarding.

HOW TO SURVIVE ON LAND AND SEA. Individual Survival. Written and revised by V-Five Association (Committee), Frank C. Craighead, Jr., and John J. Craighead. 368 Pages. United States Naval Institute, Annapolis, Md. \$4.00.

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Kansas, ddress. COMBAT BENEATH THE SEA. By Major Willy-Charles Brou. 240 Pages. Thomas Y. Crowell Co., New York. \$3.95.

BY CDR CARL E. OLSON, USN

Combat Beneath the Sea is a series of accounts of the use of underwater swimmers by Italy, Great Britain, Germany, Japan, and the United States during the Second World War. Major Brou covers the development of techniques and equipment used by frogmen in swimming and in manning "human torpedoes" and midget submarines. Although most of the book is concerned with offensive operations against ships—both combatant and merchant types—a portion is devoted to other types of operations by the frogmen.

Of special interest to Army readers will be the description of the attempts made by the German Kampfschwimmers to destroy the Ludendorff railway bridge (often referred to as the Remagen bridge) across the Rhine River after a detachment of the Ninth US Armored Division had captured it intact.

SOVIET EDUCATION FOR SCIENCE AND TECHNOLOGY. By Alexander G. Korol. 513 Pages. The Technology Press, Massachusetts Institute of Technology and John Wiley & Sons, Inc., New York. \$8.50.

BY MAJ RICHARD L. WEST, CE

The startling and highly publicized achievements of Soviet science in recent months has had a tremendous psychological impact on the entire free world. This has led to speculation as to the superiority of scientific and technical training within the Soviet Union and a serious appraisal of the quality of education within the United States.

Korol has made a detailed study of Soviet education and training methods with special emphasis on science and technology. He presents a general outline of the entire educational system of the Soviet Union and illustrates Soviet training in physics and mechanical engineering.

Although results have shown Soviet scientific and technical training to be generally effective, the author points out many deficiencies in the Soviet system. It suffers from overcentralization and overspecialization. Training is directed toward narrow vocational fields to fill specific industrial requirements rather than the broad curriculum presented in American schools at the undergraduate level. However, Soviet training in physics, mathematics, and some fields of engineering is quite good.

The aims of Soviet education are clearly directed toward enhancing the power of the Communist Party and the economic and military capabilities of the Soviet Union.

This book is the product of painstaking and exhaustive research from a wide range of source material. It is well-documented, factual, unbiased, and a significant contribution to our basic knowledge of the Soviet system.

THE SEA WAR IN KOREA. By Commander Malcolm W. Cagle, United States Navy, and Commander Frank A. Manson, United States Navy. 555 Pages. United States Naval Institute, Annapolis, Md. \$6.00.

BY LT COL MITCHEL GOLDENTHAL, CE

The United States Navy's part in the Korean war is vividly and accurately told in this exciting book which is the result of long, hard years of painstaking research. Although documentary in nature, with 170 photographs and 20 charts and maps, this volume also portrays men in war.

This book is not a biased text written to glorify a particular service, but a comprehensive interpretation and analysis with results and lessons. The entire political and military background of the Korean conflict is definitively investigated. Major military United Nations commanders of the Korean war were interviewed by the authors. These treatments make interesting reading for military students.

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BRASSEY'S ANNUAL. The Armed Forces Year-Book 1957. Edited by Rear Admiral H. G. Thursfield. 451 Pages. The Macmillan Co., New York. \$9.50.

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BY LT COL ROBERT M. WALKER, Arty

The 68th edition of the standard book of reference on British defense policy, strategy, and development of armed forces, while dealing with matter primarily from the Commonwealth point of view, is of especial interest to the United States which shares many of the British problems.

The affairs of NATO are treated at length. The organization of armed forces for the atomic age is discussed in detail.

Of especial interest to the US reader are the chapters devoted to the Middle East, with an objective and lucid analysis of Operation *Musketeer* (the Suez operation) by Captain Cyril Falls.

This edition of *Brassey's Annual* continues the high standards of accuracy and readability this valuable reference series has always maintained.

THIS HALLOWED GROUND. By Bruce Catton. 437 Pages. Doubleday & Co., Garden City, New York. \$5.95.

BY MAJ JOHN H. CUSHMAN, Inf

Bruce Catton has produced an excellent and readable addition to his several volumes on the Civil War. Here, he describes the entire panorama of that war as viewed from the Union side.

The casual reader will be rewarded with a vivid impression of the great struggle and a highlighting of its most dramatic episodes by a knowledgeable historian.

The serious student may be disappointed. The work, although colorful, is incomplete and rather difficult to follow in detail. This is understandable in a short volume of such broad scope which is directed at the reading public at large.

The text would be more clear with added maps.

ATOMIC ENERGY IN MEDICINE. By K. E. Halnan, M. D. 157 Pages. The Philosophical Library, Inc., New York. \$6.00.

BY MAJ ROBERT A. O'CONNELL, MC

This book is a short but concise treatise on radioactive material in medicine. An explanation of the fundamentals and history of nuclear medicine is given.

It is well-written and illustrated, and should be a welcome reference for the layman with little or no background in this field and for the physician not actively engaged in radio therapy or nuclear research.

THE OCCUPATION OF ENEMY TER-RITORY. By Gerhard von Glahn. 350 Pages. The University of Minnesota Press, Minneapolis, Minn. \$6.50.

BY MAJ FREDERICK A. SMITH JR., Inf

This study is a praiseworthy attempt to compile and evaluate the present law and past practice of belligerent occupation. The author has delved deeply into the subject material. However, his efforts have resulted in a scholarly piece of work that is more suitable for use by scholars in the field than by commissioned officers in the armed services.

One of the basic purposes of the study in the author's words "has been to indicate the extent to which the rules governing belligerent occupation suffer from omissions, contradictions, and half-truths and thus to show how much work remains to be done before a coherent and complete body of principles confronts belligerents of the future." In this purpose he has been successful.

For the career Army officer the book has major weaknesses in that it deals with only the belligerent type occupation. The author has not discussed the newer forms of occupation and the impact of atomic warfare because, as he implies, such matters are not yet covered by specific conventional rules.

CZECHOSLOVAKIA. East-Central Europe Under the Communists. Mid-European Studies Center Series. Edited by Vratislav Busek and Nicholas Spulber. 520 Pages. Frederick A. Praeger, Inc., New York. \$10.00.

ROMANIA. East-Central Europe Under the Communists. Mid-European Studies Center Series. Edited by Stephen Fischer-Galati. 399 Pages. Frederick A. Praeger, Inc., New York, \$8,50.

BY LT COL MITCHEL GOLDENTHAL, CE

Both these volumes continue the task of compiling and presenting accurate facts and analyses on the seven countries of Mid-Europe under Communist domination. The Mid-European Studies Center, a unit of the Free Europe Committee, Incorporated, was founded in 1950 to assist scholarly exiles to continue their work against communism. An equally important function is to increase available information on Mid-Europe which has unfortunately become a sort of terra incognita for most Americans.

The maximum measure of available Western and Communist data on Czechoslovakia and Romania has been used in these two books. This data has been subjected to painstaking security. The excellent, critical evaluations which have emerged represent truly substantial and significant progress for American scholarship and a great increase to our knowledge of the area. Each country's history, environment, politics, culture, and economy are studied and analyzed by a team of scholars, each an expert in his field.

The book on Czechoslovakia shows how and why this formerly democratic country was infiltrated and finally conquered by communism. It is interesting to note that this country was not occupied by the "liberating" forces of the Red Army and had emerged from World War II with every expectation of regaining democracy and prosperity. The tragically familiar pat-

tern of Soviet infiltration and control, followed by stark repression and economic exploitation is portrayed dramatically.

The book on Romania splendidly relates a similarly sordid story. It is of considerable interest that the Romanian Army furnished more combat troops against the Soviet Union than all other allies of Germany combined. About 14 Romanian divisions fought and were decimated at Stalingrad. In the war against Germany after the August 1944 Armistice approximately 20 Romanian divisions were used.

The military reader will find each volume extremely rewarding in prognosticating the influences of these Mid-European countries on world strategy and politics.

GEOGRAPHY IN THE 20TH CENTURY. Edited by Griffith Taylor. 674 Pages. Philosophical Library, Inc., New York. \$10.00.

BY LT COL IRVING HEYMONT, Inf

This third edition, of what has come to be accepted as a definitive work in its field, has been brought up to date and a further chapter on Relations of Geography and History added. This book is a comprehensive study of growth, fields, techniques, arms, and trends in geographical science. The 22 authors who contributed are specialists in the section which they have contributed.

The book is divided into three parts. The first deals with the evolution of geography and its philosophic basis; the second covers studies of special environments and advances in geomorphology, meteorology, climate, soils, and regionalism; and the last part deals with field work, sociological and urban aspects, the function of the geographical society, and the new field of geopacifics. A helpful glossary of over 700 geographical terms is included.

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With military forces required to be prepared for commitment in any area of the world, this book will serve as an excellent reference in any private military library. Subscriptions to the MILITARY REVIEW may be obtained by writing directly to the Editor, Military Review, U. S. Army Command and General Staff College, Fort Leavenworth, Kansas. In the following countries subscriptions will be accepted at the addresses listed below:

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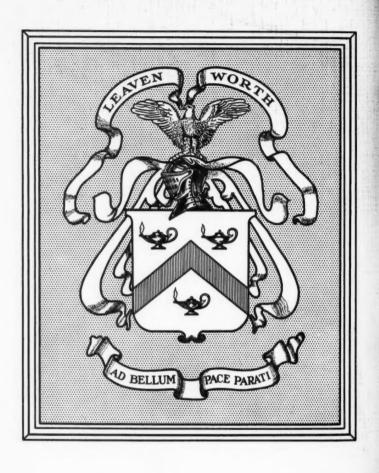
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